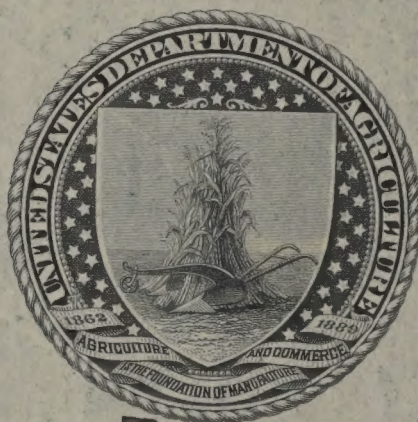


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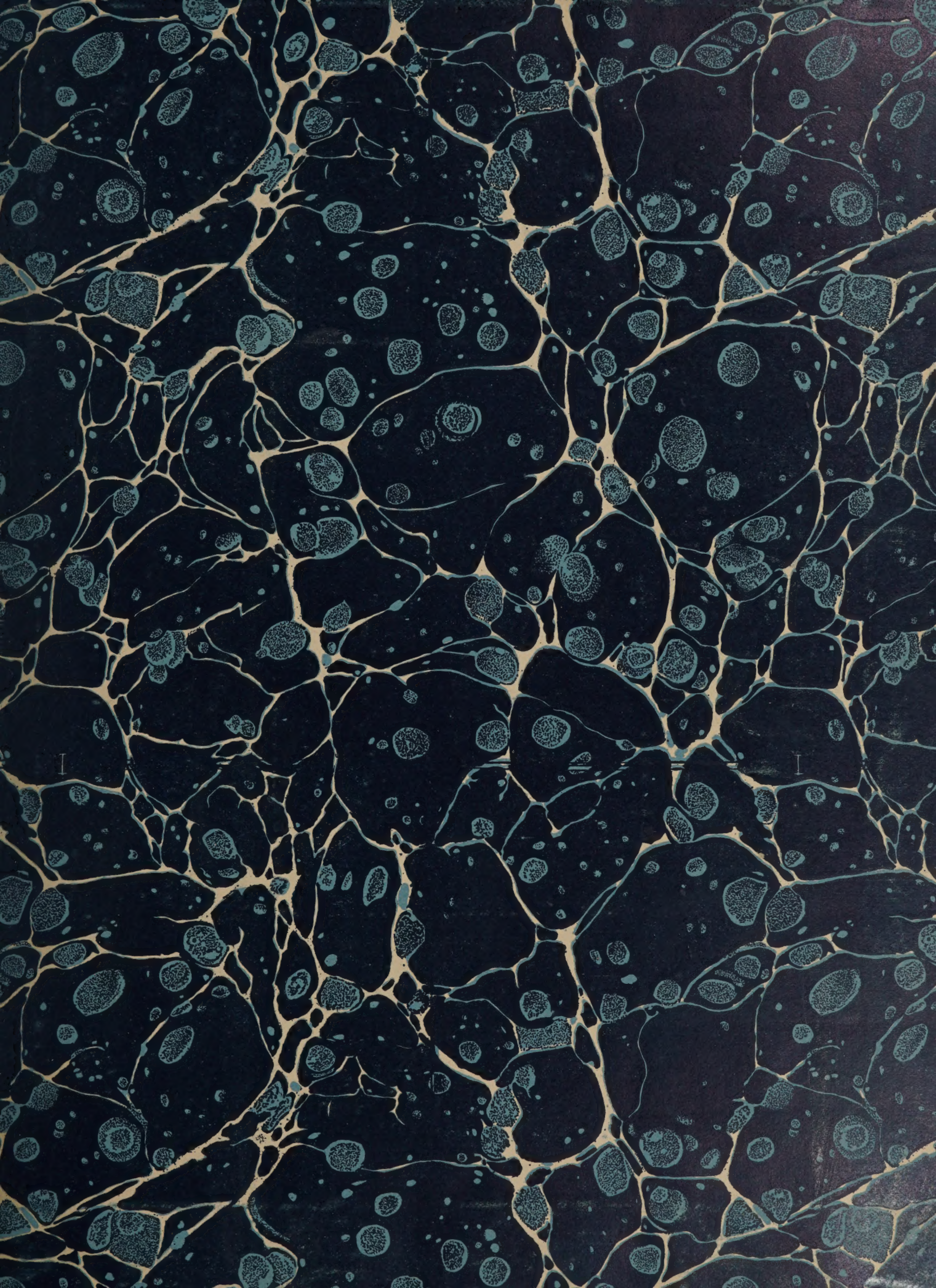
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HISTORY OF AGRICULTURAL EDUCATION IN THE UNITED STATES

1785 - 1925

by

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Part IV.

Preparation for Large Undertakings in Agricultural Education.

PART IV

Preparation for large undertakings in agricultural education 1871-1900.

Need of funds for experimentation

The lack of a satisfactory body of agricultural knowledge with special reference to American conditions made the agricultural courses in the land-grant colleges during the first twenty-five years after the passage of the Morrill Act of 1862 unsatisfactory from a pedagogical point of view and the methods of teaching, chiefly by text-books and lectures, combined with the labor requirement, made them unattractive to students. Other causes, such as the economic depression of agriculture due to the rapid development of farming on virgin soils west of the Alleghenies and the demand for engineers and factory managers due to the building of railroads and industrial plants, caused the development of these colleges to follow mainly scientific and engineering lines and turned the attention of the farm youth to pursuits other than farming.

Those who had been the chief promoters and supporters of the college land-grant act of 1862 had expected that the colleges thus endowed would do much to advance agricultural knowledge by experimental work. After these colleges were established it was soon apparent that a large amount of such work would be required before a satisfactory body of agricultural knowledge which might be used in teaching would be acquired. The success of agricultural research in Europe and to a certain extent in the United States Department of Agriculture stimulated the colleges to undertake more work in this direction, provided funds for this purpose could be obtained. They also began to realize that united action on their part was very desirable in order to enable them to plan and conduct their work in the best way and without unnecessary duplication of effort. It would also aid them in securing more adequate financial support. Such motives as these led to the meeting of representatives of the land-grant colleges, at Chicago, in 1871, which has already been mentioned. (See p.) This meeting started a movement which had three very important ultimate results, (1) Federal endowment of agricultural experiment stations under the Hatch

Act of 1887, (2) further Federal endowment of the land-grant colleges under the Morrill Act of 1890 and (3) the formation of the Association of American Agricultural Colleges and Experiment Stations in 1887.

The Chicago meeting of 1871.

The convention of friends of agricultural education at Chicago, August 24 and 25, 1871, was in pursuance of an invitation signed by representatives of 12 land-grant colleges and the agricultural college at Guelph, Ontario. The purpose of the meeting was stated as follows:

"After correspondence with those more immediately interested it has been decided to call a convention of Presidents of Agricultural Colleges, Professors of Agriculture, or other persons in the United States or British Provinces, who are engaged or interested in promoting the art or science of agriculture by experiments in the field or laboratories, for the purpose of organizing, consulting and cooperating in the great work of advancing the cause of agricultural knowledge and education, especially by experimentation⁽¹⁷⁶⁾ with similar crops under similar conditions at all the agricultural colleges."

Twenty-nine persons attended this convention, including the following representatives of land-grant colleges, J. M. Gregory, of Illinois, Manly Miles of Michigan, D. C. Gilman of Connecticut (Yale Scientific School), A. N. Prentiss of New York, John Hamilton of Pennsylvania, E. W. Hilgard of Mississippi, W. W. Daniels of Wisconsin, W. W. Folwell of Minnesota, S. H. Peabody of Massachusetts, A. S. Welch and I. P. Roberts of Iowa, Joseph Denison of Kansas and G. C. Swallow of Missouri. The Missouri Board of Agriculture was represented by its secretary, C. W. Murtfeldt and there were also representatives of six farm papers. The convention was organized with Dr. J. M. Gregory, regent of the Illinois Industrial University, as president, A. N. Prentiss, professor of botany at Cornell University, and John Hamilton, professor of agriculture at the Pennsylvania Agricultural College, as secretaries. There was much discussion about cooperation of the colleges in experimental work and a committee brought in a plan, which included experiments (1) to test variation of soil on adjacent plats, (2) planting of corn in hills and drills, and (3) uniform application of manures on adjacent plats. The relations

of the schools of applied science to one another and to other institutions were also discussed and this led to a warm debate on the kind of education which the agricultural colleges should give, particularly as to the relative importance of science and practice in relation to agricultural instruction.

W. C. Flagg, corresponding secretary of the Board of Trustees of the Illinois Industrial University, brought up the question of a permanent organization to meet from year to year or oftener to consult on experiments but perhaps to go further and be "an organization of agricultural colleges and the technological schools." Messrs. Hilgard, Flagg and Folwell were appointed a committee to consider this matter. They reported through Professor Hilgard that such an organization at this meeting would be premature but recommended that the officers be an executive committee to draft articles of association and call another meeting to consider them. There was a long discussion, during which suggestions were made that such an organization might be connected with the National Education Association or be confined to consideration of experiments but the general sentiment seemed to favor a broader and separate organization. Mr. Flagg moved "that the object of the organization to be formed at this meeting shall be the advancement of the interests of industrial education by assembling together persons engaged in agricultural and mechanical experiments and education and with a view of disseminating industrial knowledge." (176) Finally this was laid on the table with the understanding that the officers of the meeting would further consider the matter.

Mr. Flagg then offered a resolution that the examples of the European agricultural experiment stations "make us believe the establishment of not less than one such station in each of the several States of the Union would be eminently beneficial to the agricultural interests of the country" and "that a committee, consisting of one from each of the several States in which an institution founded on the national grant has been organized, be appointed by the President, whose duty it shall

be to memorialize Congress and the several State legislatures for the speedy establishment of such stations throughout the country." This was adopted by the convention and had an influence on events which followed the adjournment of this meeting.

The Washington Convention of 1872

In 1871 Frederick Watts, long-time president of the board of trustees of the Pennsylvania Agricultural College became United States Commissioner of Agriculture. (261)
In his annual report for that year he referred to the land-grant colleges and said that "if these institutions will but confer together, and adopt such principles of action as shall be common to them all and not inconsistent with the habits of the people of their several localities; establish subjects of study and rules of discipline and graduation; and especially if they will recognize and act upon the fact that this Department and they are engaged in the prosecution of a common cause and that the Department may be made the nucleus around which may be collected the knowledge of inventions, statistics and rare facts, new and improved seeds and plants, to be disseminated, distributed and experimented upon by the instrumentality of agricultural colleges, the farmer will be benefitted to a degree which will be felt throughout every vein and artery of our common country."

On December 20, 1871, Commissioner Watts issued a call for a convention of two delegates from each agricultural college, State agricultural society and State board (532) of agriculture, to meet at Washington, February 15, 1872. When the delegates convened Judge Watts in an introductory address said that the main purpose of the meeting was to bring about cooperation of the colleges and societies with the Department of Agriculture. At this meeting 32 States, the District of Columbia, and the Territories of Montana, Dakota and Utah were represented. Messrs. Gilman, Gregory, Folwell, Swallow, Hilgard, Prentiss, Hamilton, Denison, and Welch, who had been at the Chicago Meeting, were delegates and among the men especially prominent then or in the events which followed were Prof. S. W. Johnson of Connecticut, President W. S. Clark of Massachusetts, President T. C. Abbott of Michigan, Prof. George H. Cook of New Jersey, Ezra Cornell of

New York, W. O. Atwater (then of Tennessee), J. Sterling Morton of Nebraska (representing the State Horticultural Society), and Senator J. S. Morrill of Vermont. Senator Morrill nominated Dr. George B. Loring of Massachusetts for temporary chairman. He was not chosen for this position but a little later was made permanent chairman.

Commissioner Watts suggested the following matters for the consideration of the convention: (1) The expediency of seeking further land-grants from Congress for the promotion of colleges of agriculture and the mechanic arts, (2) the establishment of experimental farms and stations for the promotion of agricultural knowledge, (3) the modification of military instruction in the national colleges of agriculture and mechanic arts and (4) the best methods of cooperating with one another and with the Department of Agriculture. Afterwards he proposed resolutions that (1) agricultural colleges should be distinctively agricultural in government and teaching, without excluding any branch of knowledge, (2) manual labor should be practical and taught in them, (3) females should be admitted, (4) horticultural and agricultural societies should unite with the schools and colleges on any plan of education "by which the light of knowledge should be made to shine upon their work", and (5) the Department of Agriculture should have such relations with the agricultural colleges, schools and horticultural and agricultural societies that there may be a continuous exchange of information, seeds, roots, plants and publications.

In an address on "equalization of land-grants" President Folwell of Minnesota favored asking Congress for a land-grant of from 500,000 to 2,000,000 acres per State on the basis of relative area. This new grant should be available for university purposes, but with the proviso "that any institution whatever which fails to conduct the department of agriculture and the mechanic arts in the most efficient manner practicable shall forfeit the whole endowment." (532) Dr. Gregory of Illinois said that President Folwell's proposition had been presented in printed form. He also called attention to the bill granting the net proceeds of the sales of public lands for

common schools which had passed the House of Representatives and opposed its passage by the Senate. He favored the use of the public lands fund for education but would have it distributed on the following basis: One-third for teachers or school libraries apportioned according to the number of children between 6 and 15 years in the several States; one-third for normal schools or normal classes in high schools; and one-third for agricultural, polytechnic and other State colleges and universities, to be apportioned one-half according to population and one-half according to area of the State. To consider this matter a committee on equalization of land-grants was appointed, consisting of Messrs. Folwell, Bowman (Kentucky), Gilman, Abbot and Fielder (Georgia). This committee reported in favor of an additional grant of not less than 1,000,000 acres to any one State for the institutions receiving the benefits of the Act of 1862. After much debate and many alternative propositions the report of the committee was rejected. Later Senator Morrill introduced a resolution "that, as a sense of this convention, we deem it of paramount importance to ask of Congress, as we do earnestly, for an additional donation of land, or proceeds of land, sufficient to found a professorship of some of the branches of practical science in each of the colleges now wholly or in part sustained by the previous land-grant of Congress." (532) This resolution was adopted. Reference is also made in the published proceedings to a committee of six on appropriations but the members of this committee are not recorded.

The convention also had a committee on experiment stations, including Hunter Nicholson of East Tennessee University, Daniel Needham of the New England Agricultural Society, John Hamilton of the Pennsylvania Agricultural College, S. W. Johnson of the Yale Scientific School and L. F. Allen of the New York State Agricultural Society. This committee had the cooperation of the committee appointed at the Chicago convention. The joint report, read by Prof. W. O. Atwater, dwelt on the importance of speedily establishing experiment stations in the United States with the help of individuals, agricultural societies, the States and the Federal Government.

To aid this it was recommended that the committee be continued and that Professor Johnson prepare a further report on the character, value and practicability of experiment stations and that the Department of Agriculture be asked to cooperate in preparing, publishing and disseminating this report. This recommendation was approved by the convention. The convention adjourned to meet in February 1873 and Commissioner Watts sent out an invitation for this meeting but for some reason it was not held.

The movement for Federal aid to common schools.

After the Civil War and the passage of the amendments to the Constitution giving the rights of citizenship to the negroes who had been slaves much public sentiment was created in favor of granting Federal aid to promote their education. It was also realized that the Southern States had a heavy burden in establishing school systems which would provide even an elementary education for great numbers of both white and black children for whom there had been no schools. Among those who believed that the Federal Government should do something to reduce illiteracy wherever it was prevalent in the United States was George F. Hoar of Massachusetts who had entered the Federal House of Representatives in 1869. Under his leadership and with the aid of Mr. Perce of Mississippi, a Northern soldier who had settled in that State after the Civil War, a bill passed the House February 8, 1872, "to establish an educational fund and to apply the proceeds of the public lands to the education of the people." (H. R. 1043). Under this bill "the net proceeds of the public lands are hereby forever consecrated and set apart for the education of the people", provided, however, that the preemption and homestead laws must remain in force and that the power of Congress over the public domain, including the granting of bounty-lands to the soldiers and sailors of the Civil War, shall not be limited or abridged. The Secretary of the Interior shall annually ascertain and certify to the Secretary of the Treasury the net proceeds of the public lands for the preceding year. The

Secretary of the Treasury shall invest these proceeds in United States five per cent. bonds, which shall constitute a perpetual fund to be known as the national educational fund, and shall annually certify to the Secretary of the Interior and the Commissioner of Education the amount of this fund and the accrued interest for the year. The Commissioner shall then apportion to the several States and Territories and to the District of Columbia upon the basis of population between the ages of four and twenty-one years, one-half of the net proceeds of the public lands for the previous year, together with the whole amount of the income of the educational fund, provided, however, that for the first ten years the distribution of this fund shall be on the basis of illiteracy of the respective populations as shown by the preceding United States census. To receive this fund the State through its legislature must agree "that it will provide by law for the free education of all the children between the ages of 6 and 16 years" and will apply all money received under this act in accordance with its conditions. Fifty per cent. of the fund thus distributed may be used the first year and 10 per cent. thereafter for normal schools but after the first year only for the salaries of teachers in such schools.

Authority was given to the Commissioner of Education to withhold certification, in which case the money would be held in the Treasury subject to appeal to Congress at its next session. Within each State or Territory or the District of Columbia the Superintendent of public instruction must apportion the fund to the school districts which have provided common schools for at least three months during the preceding year, on the basis of population of the school district, number of children of school age or school attendance and the amount so apportioned must be solely used for payment of teachers' wages. A detailed statement of payments and balances must be annually made to the Commissioner of Education by the State officer responsible for the fund. If the funds are misapplied or lost by any State or Territory it cannot receive subsequent allotments until such funds are replaced, and persons convicted of

misapplying such funds may be penalized by fine or imprisonment or both, under the jurisdiction of the circuit courts of the United States.

This bill did not pass the Senate but it affected unfavorably the effort of the land-grant colleges to secure additional Federal endowment. Some of its language was embodied in subsequent bills relating to these institutions.

The Morrill educational bills -- 1872-1888

The committee appointed by the agricultural convention of 1872, with knowledge of the common school bill, immediately drafted a bill for additional Federal aid to the land-grant colleges. Senator Morrill introduced this bill February 23, 1872 (S. 693) with the statement that it had been presented to him "by a committee representing a convention that recently assembled at the Agricultural Department, a convention of a body of men of high character. and hardly ever surpassed in this country for their intelligence. While I have not examined the bill in detail I cordially approve of its general scope and purpose." (714)

This bill provided in three sections that for the more complete endowment and support of the colleges of agriculture and the mechanic arts established under the act of Congress of July 2, 1862 there is hereby appropriated to each State in which such colleges have been or may be established, 1,000,000 acres of public lands. On certification of the Governor that at least one such college has been established in his State, the Secretary of the Interior shall issue to the board of control of the college warrants for that amount of land or its equivalent in value if the price has been doubled in consequence of railroad grants. This land must not be sold for less than the Government price nor withheld from sale if five dollars an acre is offered by persons desiring it for use or settlement.

If the land is situated in a State other than that in which the college is located the trustees must surrender to that State one-third of this land in lieu of taxes for 15 years from the date of location.

511

This bill was referred to the Committee on Education and Labor and reported back by Mr. Morrill March 11, 1872, with amendments, which fixed the amount of land to be surrendered for taxes at one-fifth of the total located in another State and exempted the remaining four-fifths from taxation for 10 years unless sold at an earlier period.

Meanwhile the Senate had received a bill passed by the House of Representatives, which amended the land-grant act of 1862 in the interests of the State of Oregon. This was referred to the Committee on Agriculture from which it was reported favorably April 1, 1872. This bill passed the Senate and as approved by the President June 4, 1872, permitted Oregon to locate about 90,000 acres of land within her borders for the land-grant college, with the proviso that these lands should not be sold for less than \$2.50 per acre.

Two bills to extend the time within which the act of July 2, 1862 shall be accepted and colleges established beyond that provided by the act of July 23, 1866, were presented in the Senate and referred to the Committee on Education and Labor, which reported a single bill on April 12, 1872.

These minor bills served to keep the land-grant colleges and the problems connected with their Federal grants before the Senate pending the discussion of the much broader measure relating to a greatly increased Federal endowment for these colleges in all the States.

On May 14, 1872 Mr. Morrill presented an amendment in the nature of a substitute for his bill of February 23. This substitute appropriated to each State and Territory in which land-grant colleges have been or may be established within five years from the passage of this act, "the proceeds of the sale of five hundred thousand acres of public lands, estimated at one dollar and twenty-five cents per acre", on the conditions prescribed in the act of July 2, 1862. Whenever the Secretary of the Interior shall have the certificate of the governor of any State or Territory, or other satisfactory evidence of the establishment of one or more land-

grant colleges in such State or Territory he must certify this fact to the Secretary of the Treasury and to the college trustees.

The Secretary of the Treasury on application of the trustees must issue to them a certificate setting forth that they are entitled to the fund appropriated in this act. On July 1, 1872, and annually thereafter he must ascertain the net amount of sales of public lands for the preceding year and invest the same in United States registered five per cent. bonds or he may issue such bonds to the colleges, but keep them in the Treasury and pay the interest semi-annually to the college trustees. If at any time it appears to the Secretary of the Interior that any State or Territory is not acting in good faith respecting this act he must notify the Secretary of the Treasury who will then withhold the interest due that State or Territory until the Secretary of the Interior is satisfied as to its compliance with the law. Where no land-grant college has yet been established, the funds created under this act shall be appropriated to one college only in such State or Territory.

More than six months elapsed before this bill was considered in the Senate. Meanwhile apparently Mr. Morrill pursued the course which had proved successful in the case of the original land-grant bills. That is, with the aid of representatives of these colleges and other friends of increased Federal endowments to them, including State legislatures, he ascertained quite definitely what Senators would steadily support his measure. There was also an understanding that the friends of this measure would not take much time for speeches in the Senate but would press for a vote as soon as it seemed best to do so. When he thought he had a majority in its favor he brought the bill before the Senate. The debate on it began December 5, 1872, with an introductory statement by Mr. Morrill. (See **Congressional Globe**, Dec. 5, 1872)

Mr. Morrill opened the discussion with a speech of considerable length. The "land States", he said, "have been properly jealous about having large tracts taken by speculators or indefinitely withheld from settlement. The bill as now

framed will prevent any such result. The difficulties in disposing of the scrip under the act of July 2, 1862, were largely due to the very large grants for military services. This measure also avoids any interference with the homestead law. The fund established by this bill will be permanent and well under the control of the Government. Some years must elapse before the act will have its full effect but in the end each institution will get an annual income of not less than \$30,000.

The success of the institutions established under the previous act has been sufficient to show that with additional funds they will do a greater work. Good places are open to their graduates. The demand for teachers trained in them greatly exceeds the supply. The terms of the act of 1862 "are perhaps broad enough to include the curriculum of even a modern university, but it was clearly intended that these national colleges should place scientific or practical studies foremost as the leading object, and whatever else might be added, that these were in no case to lag in the rear." * * * "The design is not to lower even the highest rank of scholarship but to raise up more scholars. * * * We seek to have among us not only some of those who comprehend all that was known among the ancients, but more who are able to surpass them. * * * In other lands and under other forms of government education may be optional; with us it is indispensable. * * * We want a system of broader education for the American people in the arts of peace." Other nations are moving in this direction. Examples of success in various States are cited. They show that "while there is much of encouragement, there is much more required." Equal State distribution of funds, as proposed in this bill, "is necessary in order to escape the extremes of either giving too much to some States or too little to others." "Any rule according to population would plant colleges in more than half the States of such puny strength and with such inferior equipments that they could never take root." "The beneficiaries under the original grant all recognize and cordially indorse the propriety of the present bill. * * *

which
The agricultural convention^A met here last winter, from all parts of the Union gave this measure their individual support, and to them should be credited the idea of an equal donation to all the States regardless of the amount of population."

"Students move freely from State to State and go out from colleges to distribute themselves more widely. In giving public lands for education we are only following a policy long ago established. This bill carried grants of less than four per cent of the public lands yet remaining, hardly more than we have donated to single States and not so much as to single corporations."

The bill went over until January 13, 1873, when it was discussed at some length, after an unsuccessful attempt had been made to displace it by the substitution of other measures. Senator Windom of Minnesota offered an amendment to prevent interference of this act with the homestead or preemption laws. This was agreed to. It then appeared that some of the strong leaders in the Senate were opposed to the bill. Senator John Sherman of Ohio pointed out that since there were 46 States and Territories the bill would grant 23,000,000 acres at \$1.25, amounting to \$28,750,000, while the proceeds of the sale of public lands were only \$2,000,000 annually. These proceeds are money in the Treasury and if this money can be distributed at all to the States under the Constitution it must be according to population. The land-grant act of 1862 "did more harm to the Western States than all the agricultural colleges founded under it can ever do good." If this money is to be granted for education it would be better to give it to one centrally located institution. Later he moved that "common schools" be substituted for "colleges" in the bill but this amendment was rejected. He also unsuccessfully endeavored to make an express provision that residents of all the States and Territories should be eligible to enter any land-grant college and that this new fund should be subject to all the conditions and limitations of the Act of 1862. Senator Thurman of Ohio objected to the bill in its present form and unsuccessfully moved its reference to the Committee on Public Lands. Senators Morton of Indiana and Conkling of New York

were opposed to the method of distribution of the fund proposed in the bill. Senator Tipton of Nebraska unsuccessfully moved to permit States having 500,000 acres of public land to take the land in lieu of proceeds of sale.

Senator Windom opposed the bill because it would interfere with the homestead and preemption acts. He pointed out that during the past four years the proceeds of public lands had averaged \$3,733,712 or about \$43,000 per State. Each State would therefore get only about \$2,500 interest annually.

Senator Trumbull of Illinois believed that the homestead act would ultimately do away with sale of public lands and that it would be better to give the colleges money directly from the Treasury. Senator Hamilton of Maryland opposed the bill because it would give the Federal government control of the colleges and Senator Vickers of that State unsuccessfully moved to grant the fund to the States rather than to the colleges.

There was evidently much sentiment in the Senate in favor of Federal grants to common schools. This was expressed by Senators Wilson of Massachusetts, Howe of Wisconsin and others.

Among the active supporters of the bill were Senators Frelinghuysen of New Jersey, Patterson of New Hampshire, Flanagan of Texas, and Sawyer of South Carolina. Senator Morrill strongly resisted efforts to amend the bill but himself secured the omission of the Territories from this measure. It passed the Senate January 14, 1873, by a vote of 39 to 14, with 21 absent. Both the Senators in the following States voted in the affirmative: Connecticut, Iowa, Maine, Mississippi, Nebraska, Nevada, Oregon, Pennsylvania, Rhode Island, Texas, Vermont and Virginia.

The bill was received in the House of Representatives January 15, 1873. An unsuccessful attempt was made February 10, 1873, to suspend the rules in order to pass it with an amendment in the nature of a substitute offered by Mr. Perce of Mississippi. It was brought up for consideration February 17, 1873, when the sub-

stitute bill with one amendment was offered and the previous question was moved and seconded. Thus the bill was passed without debate by a vote of 120 yeas, 70 nays and not voting 50. A majority of members in the following States were opposed to this bill: Illinois, Indiana, Kentucky, New Hampshire, New York and Ohio.

The substitute bill was then drawn to conciliate those who wanted the way clearly left open for the use of at least a part of the proceeds of the sale of public lands for the common schools. It provided that on July 1 of each year the Secretary of the Treasury shall ascertain the amount of sales of public lands for the previous fiscal year and after deducting the expenses incurred by such sales, invest one-fourth of this amount in United States five per cent bonds and issue them to the land-grant colleges, giving to each State and to the District of Columbia an equal share and paying the interest semiannually to the college trustees; he shall also pay annually to the trustees of each college their share of an additional quarter of the proceeds of the sales of public lands, provided that the total annual appropriation to any State or the District of Columbia shall not exceed \$50,000. And provided further that the share allotted to the District of Columbia shall be appropriated to the Smithsonian Institution, for the support of the National Museum and in distributing specimens and publications to the colleges named in this act and to other institutions.

The bill came back to the Senate February 18, 1873, was printed and on February 24, 1873, was called up by Mr. Morrill "for the purpose of concurring in the amendment made by the House of Representatives." Immediately there was objection but the Senate voted to consider the bill. Mr. Windom then unsuccessfully moved to refer it to the Committee on Public Lands. A motion to lay the bill on the table was also defeated. Then followed a long debate in a session which lasted until nearly midnight and was resumed on February 25, 1873. It was evident that the opponents of the measure intended to kill the bill by indefinitely prolonging the discussion and by continual offering of amendments. One of these amendments

which is interesting in the light of later legislation was a proposition to divide the fund between the whites and negroes on the basis of their relative number in the several States. Mr. Morrill stoutly opposed amendments on the ground that any amendment at this time would kill the bill.

Senator Sherman made the most comprehensive speech in opposition to the bill. He dwelt on the importance of the measure, which involved a permanent appropriation of \$1,900,000 and eventually more annually; permanent appropriations have been against the policy of the government from the time of Thomas Jefferson; this is the second time that an attempt has been made to permanently appropriate the proceeds of the public lands and the first bill passed for this purpose was soon repealed; the public lands have always been considered as a source of revenue; the proposed distribution of funds is unequal and unconstitutional because it disregards the relative population and wealth of the States; this grant is a palpable discrimination against existing colleges maintained by State and private funds; the bill provides for too many colleges; there is no common design, no common plan for these national colleges; this measure will lead to the practical abandonment of the preemption and homestead laws; the bill has never been considered by the people; the House bill is worse than the Senate bill because it provides for a permanent appropriation; the bill will not help the ignorant negroes in the South because they cannot use the colleges; the bill faces a deficiency of revenue and for that reason alone ought not to be passed; it certainly ought to contain a provision for its repeal.

Finally Senator Windom proposed that the Senate non-concur in the amendment adopted by the House and appoint a conference committee. Senator Morrill, apparently seeing no way to secure passage of the House bill, agreed to this, and it was adopted by the Senate. Senators Morrill, Sawyer and Stevenson were members of the committee. On March 3, 1873, the request of the Senate for a conference was considered in the House. Mr. Perce, in charge of the bill, opposed a conference. Ap-

parently the friends of Federal aid to common schools had decided to kill the grant to land-grant colleges. A two-thirds vote was required to authorize the conference and the House refused to accept the Senate's proposal. The bill therefore died.

In the course of the debate on this bill senators often referred to the land-grant institutions as agricultural colleges. Mr. Morrill objected to this designation. He preferred to call them "national colleges" - "institutions that will educate all our people for all their different avocations, and let them be employed in agriculture, in the mechanic arts, or anything else, that they shall have a place, and that within a reasonable distance, where they can obtain that education which shall be most desirable for them." (See Congressional Globe, Jan. 13, 1873)
^ "The law under which these colleges are established does not make them agricultural colleges." "It is a broad education, intended to be sure to teach the agriculturist, and to reach all our industrial classes." (See Congressional Globe, Jan. 14, 1873)
^ (See Congressional Globe, Feb. 24, 1873)

Mr. Morrill was evidently impressed with the strength of the movement, supported by many influential members of Congress, to secure Federal aid for common schools, in order to diminish illiteracy, especially among the negroes in the South. Therefore the bill (S. 167) which he introduced in the Senate December 15, 1873, not only provided "for the further endowment of national colleges for the advancement of general, scientific and industrial education", but was also intended "to establish an educational fund and apply the proceeds of a portion of the public lands to the support of public education." (See Congressional Record, Dec. 15, 1873)
^ In introducing this bill Mr. Morrill attempted to conciliate those senators who feared a deficiency in Government finances, particularly in view of the great panic which was then distressing the country, by stating "that this bill is not designed to divert any funds from the Treasury Department for the coming year." He described the new bill as "a modification" of the measure which had passed both houses. Changes had been made in "the mode and manner of distribution and the amount, so as to meet some objections then made; and it also combines the subject of national colleges with public education." This bill was referred to the Committee on Education and Labor, where it died. Unfortunately it was not printed and its exact nature is not known.

Mr. Hoar, in 1874, reintroduced his bill for aid to common schools. And now an attempt was made to discredit the land-grant colleges and thus prevent their getting further Federal grants. The history of this effort has been well stated by President Atherton in his address on the Legislative Career of Justin S. Morrill before the land-grant college association in 1900, as follows:

* * * "on the 2d day of February, 1874, the House, on the motion of Mr. James Monroe, then a professor in Oberlin College, and a member of the House, adopted a resolution instructing the Committee on Education and Labor 'to inquire into the condition and management of the agricultural and other colleges which have received grants from the United States under the act of July 2, 1862.' Mr. Monroe had been an earnest opponent of the college bill in the previous session, and this movement was looked upon by the friends of the colleges as distinctly hostile, or, at best, as intended to delay any legislation in their behalf. The committee prepared and sent to all the colleges a long list of questions covering every possible phase of their work and history, and many of them impossible of a definite answer for the reason that they seemed to assume a like condition of things in every State, or at least varying conditions that could be reduced to the same statistical standard. It was agreed among the colleges, however, through some correspondence, that all should make the fullest and frankest answers that were possible under the circumstances, and this was finally done by all except two - Kansas and Florida.

On the 13th of January, 1875, Mr. Monroe presented the report of the committee (Report No. 57, Forty-Third Congress, second session).

The report avowedly refrains from discussing all questions of general policy involved in the establishment of these institutions, and expresses gratification at the desire shown by most of them, not only to furnish the facts sought for, but to aid the committee by suggestions as to the best method of accomplishing its object. It then proceeds to summarize the facts ascertained respecting the sale of lands and land scrip, the investment of the proceeds in the several States, the financial management of the fund, the amount of income from it, and the educational results. The institutions themselves are described as being 'in a state of formation', some States having not yet made provision for the establishment of colleges, and others but recently - only six in all having been in operation prior to 1865. The report concludes, therefore, that it was then 'too early to obtain intelligent answers' to the questions asked, and adds that, while 'there is nothing in the results thus far attained that can be called discouraging, * * * a considerable number of the colleges have done work which requires no apology, and a few of those earliest organized have already found time to take high rank among the institutions of the land.'

'It must be added', continues the report, 'that the reports sent from these colleges reveal, in many cases, a certain fresh interest and spirit of youth, a new enthusiasm, which when intelligent and enduring is one of the best prophecies of success. Strong evidence is afforded of the power of these institutions to establish sympathetic relations between themselves and the communities in which they are placed, in the fact that they have already received in appropriations from States and in donations from towns, counties, and private individuals an amount almost equal, in the aggregate, to the whole bounty of the Government.'

It seemed proper to call attention to this report because it was the first and the last movement in Congress which has ever betrayed the slightest distrust of the work that was being done by these institutions, and it is gratifying to add that Mr. Monroe himself was so convinced by his inquiry that he not only made his report, as we have seen, a strong justification of them and their work, but became and remained ever after one of their steadfast friends." (640)

On January 25, 1875, Mr. Morrill introduced a bill (S. 1187) in which the first and main proposition was to establish an educational fund in order to give Federal aid to common schools. The land-grant colleges were to have a part of this fund. This bill was ordered printed and laid on the table, from which it was never taken.

It is, however, interesting as being a measure which with various modifications in details was under consideration in Congress at different times within the next fifteen years. It was essentially a combination of the bill for Federal aid to common schools which had passed the House of Representatives in 1872 with the bill for aid to the land-grant colleges which passed that House in 1873 but which the Senate refused to accept. It required the Secretary of the Interior to certify to the Secretary of the Treasury annually the net proceeds of the sales of public lands during the previous year. The Secretary of the Treasury must then invest one-half of these proceeds in five per cent United States bonds and the sums thus invested shall constitute a perpetual "educational fund" which with accrued interest must be annually certified to the Secretary of the Interior and the Commissioner of Education. The Commissioner of Education must then apportion to the several States, Territories and the District of Columbia one-half of the proceeds of the public lands for the previous year, according to their population between the ages of four and twenty-one years, provided, however, that for the first ten years the distribution should be on the basis of the population of 10 years old and upward who cannot write. The first year fifty per cent and thereafter 10 per cent of the amount thus distributed may be used for the training of teachers by normal schools. Each State, Territory and the District of Columbia must provide free education for all children of school age, apply the Federal fund in accordance with the provisions of the act and make full statistical reports regarding its public school system. The Federal fund must be paid to the State treasurer or other properly qualified officer on the warrant of the Commissioner of

Education and if he does not issue this warrant the sum thus withheld shall remain in the Treasury unless Congress at its next session shall ~~be~~ otherwise direct.

The income of the educational fund was appropriated to the land-grant colleges, one-half in equal shares to each State and the District of Columbia and one-half in proportion to the number of their respective Senators and Representatives in Congress, until the amount thus appropriated equaled five per cent on 400,000 acres of public land at one dollar per acre and in addition 30,000 acres for each Senator and Representative. The remainder of the income of the educational funds would thereafter be given for the support of common schools. Whenever the Secretary of the Interior had the certificate of the Governor of any State, or other satisfactory evidence regarding the land-grant college or colleges in that State he must certify the fact to the Secretary of the Treasury and to the trustees of the college and on their application issue to them a certificate that they are entitled to their proportionate share of the amount provided for in this act. The trustees must then send a written pledge to the Secretary of the Interior that they will apply this new Federal fund for the purpose and in the manner set forth in the act of 1862, after which the money will be paid to them on the warrant of the Commissioner of Education. For every \$200 received by the college under this act a competitive scholarship covering tuition must be established.

On January 25, 1876 Mr. Morrill again introduced the common school and land-grant college bill with slight modification, reducing somewhat the maximum amount to be given each State. This bill (S. 334) was referred to the Committee on Education and Labor, which reported it February 17, 1876 with amendments defining illiterates as persons who cannot read and write, and requiring equal facilities and opportunities for all children in the common schools receiving the benefits of this act.

A substitute bill was submitted April 20, 1876, by Senator Maxey of Texas. This was a somewhat simpler measure, following the general lines of Mr. Morrill's bill. As regards the colleges it provided that the States or Territories receiving the benefits of this act must appropriate to the land-grant college one-half of the amount received under the act for the first five years, one-fourth for the next five years and thereafter one-half, until a maximum of \$30,000 was reached. Thereafter the remainder of the income from the educational fund must go to the common schools.

On April 26, 1876, the bill was considered in the Senate. Mr. Morrill spoke at considerable length. He refers to other educational propositions pending in the Senate and House but thinks it should not be difficult to reach an agreement. All public lands not called for as homesteads should be held for education. Already by previous legislation Congress has given 140,000,000 acres to the new States for support of common schools, and 18 States have a fund of \$43,866,785. The Southern States especially need aid. Only about one-half the school population actually attend school and only 180,372 negroes out of 4 or 5 millions. Five and a half million of the population cannot write and four and a half million cannot read. Congress has complete power over the public lands. The ordinance of 1787 laid down a broad educational policy for the Federal Government in the statement that "schools and the means of education shall forever be encouraged." Colleges, as well as the common schools, are needed, especially for the teaching of science and its applications. Discontented laboring men should have opportunities for practical education. National character is at stake and education for the masses is demanded. Railroads so far have had a lion's share of the public lands. Military training in colleges to supplement that in the national military schools is desirable. The 28 land-grant colleges have 3,842 students and 316 instructors, an average of 137 students, and 12.7 instructors. The 323 older institutions have 25,010 students and 3,108 instructors, an average of 77 students and 9.6 instructors. The value of education

in agriculture and the mechanic arts has been demonstrated. There is still great need of qualified teachers. The older and well-established colleges have nothing to fear from the new colleges. Colleges are needed in many States to keep the students nearer home. The number of those giving thorough education is disproportionately small. Students are needed especially for industrial classes. This legislation will tend to kindle a national passion to have Americans the best educated people. Mr. Maxey followed Morrill and dwelt especially on the long established Federal policy to aid schools and the present need of the South.

Nothing further was done with the bill.

On March 24, 1879, Senator Burnside of Rhode Island introduced Morrill's bill (S. 133) and it was referred to the Committee on Education and Labor, where it remained until February 19, 1880, when it was reported with amendments. This bill differed from former bills principally in adding proceeds from patents to those from public lands in the "educational fund", reducing the interest on the bonds to 4 per cent and permitting the Secretary of the Treasury to accept gifts for educational purposes. One-third of the income of the educational fund was to go to the land-grant colleges up to \$30,000 per State. The chief committee amendment was a new section restoring the provision that one-half the amount for common schools the first year and 10% thereafter might be spent for normal schools. The bill was called up in the Senate February 27, 1880, and made a special order for March 8. At that time Senator Morgan of Alabama offered an amendment requiring admission of women to the land-grant colleges. It then went over to May 24, 1880, when Senator Burnside for the committee offered a few verbal changes. On December 9, 1880, he gave notice that the bill would be taken up but when this was done on December 14 and Mr. Morrill got the floor, the Senate went into executive session.

The next day Mr. Morrill gave Mr. Burnside an opportunity to speak briefly in commendation of the bill as a step in the right direction but not great. Mr. Morrill then explained the bill. Referring to the Act of 1862 he said that "the

object of this law was not to injure any existing classical institutions but to re-enforce them and to bring liberal culture within the reach of a much larger and un-
 (See Congressional Record Dec. 15, 1880)
 provided-for number of the industrial classes in every State." ^ "This and more was

sought to be accomplished by bringing forward, at less cost of time and money, courses of study of greater use in practical affairs, than those then largely prevailing which seemed to offer little of lasting value beyond the mere discipline.

* * * A wider range in scientific studies, more freedom of choice, had become indispensable in order to include the large and varied stores of knowledge extant in the world and to more definitely satisfy the multiplied intellectual activities and industrial wants of the age." The land-grant colleges "were undoubtedly intended to be broad enough to 'comprehend all learning' and to educate all classes." He cites the favorable report of the Committee on Education and Labor of the House of Representatives after its investigation of these colleges.

He also quotes from a communication of the Commissioner of Education to him on May 1, 1880, when 34 land-grant institutions reported 461 professors and 37 had 6,671 students. 11 reported 1,394 free State scholarships. 32 had 11,533 acres in farms, an average of 360 acres. He concludes with a long statement on the duty of the nation to promote the education of all the people.

Senator Brown of Georgia then spoke in favor of the bill, emphasizing the need of the South for common schools, especially for negroes. The bill was then discussed during the two succeeding days and a number of Senators participated in the debate. Senator Teller of Colorado offered an amendment intended to devote the bill wholly to Federal aid for common schools and to give for that purpose the principal of the educational fund (then about \$1,000,000), instead of merely the interest (about \$40,000). He did not believe it was wise to establish a perpetual fund or to provide for collegiate education. This was much discussed, adopted in the Committee of the Whole by a vote of 31 to 30 but rejected in the Senate by a tie vote. Senator Hoar defended the bill and especially the use of patent funds for education, a pro-

vision for which he was probably responsible. He would like to include funds derived from railroads. He secured an amendment that State school laws should govern regarding the age of children to be benefitted by this act.

Senator Blair, a well-known friend of Federal aid to common schools, favored the bill as reported by the Committee on Education and Labor, including the grant to land-grant colleges, but thought a much larger educational fund should be established.

Senator Bailey secured an amendment authorizing the retention of the fund in the Treasury, with the payment of the equivalent of 4% interest, instead of investing in bonds. Senator Ingalls tried unsuccessfully to cut out provision for the land-grant colleges and spoke unfavorably regarding the usefulness of these institutions. Senator Morgan's amendment admitting women to these colleges was adopted, as well as the addition of a section providing for the training of teachers. A number of other amendments of lesser importance were also adopted. The word "national" as a designation of land-grant colleges was stricken from the title of the bill. The amended bill passed the Senate December 17, 1880, with a vote of 41 yeas, 9 nays and 29 absent.

In the House of Representatives, Mr. Goode of Virginia on behalf of the Committee on Education and Labor, on January 20, 1881, tried unsuccessfully to have a day fixed for taking up this bill and on February 21, 1881, failed to secure a suspension of the rules preventing its consideration. Thus the bill died.

On May 4, 1882, Senator Miller of California introduced a bill (S. 1829), to amend the land-grant act of July 2, 1862, so as to enable California to invest its land-grant fund in good stocks or mortgages on real estate. This bill, as amended by the Committee on Finance, reported by Mr. Morrill, permitted any State having no State stocks to invest this fund "in any other manner" after the legislature "assented thereto and engaged that such funds shall yield not less than five per cent * * * and (See Congressional Record June 27, 1882) that the principal shall forever remain unimpaired." The amended bill passed both houses and was approved March 3, 1883.

On January 23, 1884 Senator Morrill introduced a bill (S. 1235) which was like the educational bill (S. 133) passed by the Senate in 1880 except that one-half of the annual returns of railroads took the place of receipts from patents, which had been in the previous bill. This new bill was reported without amendment March 12, 1884, by Senator Pugh for the Committee on Education and Labor. It engaged the attention of the Senate momentarily three times in December 1884 and was put to its final sleep on the calendar January 5, 1885. The same bill was reintroduced by Mr. Morrill in the 49th Congress on February 17, 1886, and in the 50th Congress May 1, 1888, but in both cases it was laid on the table and no further action regarding it was taken.

The friends of federal aid for common schools were not satisfied with the proposals for that purpose contained in Senator Morrill's bills, which they considered inadequate. Under the leadership of Senators Blair of New Hampshire and Hoar of Massachusetts several large bills for this purpose were introduced and considered in the Senate.

Mr. Blair entered the Senate in 1880 and on December 6, 1881, introduced a bill "to aid in the establishment and temporary support of common schools." It provided

"That for ten years next after the passage of this act there shall be annually appropriated from the money in the Treasury the following sums, to wit: The first year the sum of fifteen millions of dollars, the second year the sum of fourteen millions of dollars, the third year the sum of thirteen millions of dollars, and thereafter a sum diminished one million ^{or dollars} yearly from the sum last appropriated until ten annual appropriations shall have been made, when all appropriations under this act shall cease; which several sums shall be expended to secure the benefits of common-school education to all the children living in the United States."

This fund was to be allotted to the States, Territories and District of Columbia "in that proportion which the whole number of persons in each who, being of the age of ten years and over, cannot read and write, bears to the whole number of such persons in the United States." A bill of this character passed the Senate in 1884 and again in the 49th Congress. These bills attracted much attention both in and out of Congress and were actively supported or opposed by many people. In the end public opinion crystallized against the use of federal funds for this purpose.

Mr. Morrill's attempts to utilize the sentiment in favor of federal aid to common schools to float appropriations for the land-grant colleges proved a mistaken policy but he persisted in this course until 1890. (See p. 570)

The early agricultural experiment stations and meetings of agricultural teachers.

Meanwhile the agricultural forces interested in teaching and research were strengthening their position and making a beginning of united action. Following the convention at Washington in 1872 there was increased activity in agricultural experimentation in the United States Department of Agriculture and the land-grant colleges. Beginning with 1875 agricultural experiment stations were organized, first at Middletown, Conn., (transferred to New Haven in 1877), and during the next ten years in Alabama, California, Colorado, Indiana, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, Nebraska, New Jersey, New York (Geneva and Ithaca), North Carolina, Ohio, Tennessee and Wisconsin. Of these 18 stations, 7 were organized separately under State laws but all except those in Louisiana, New York (Geneva) and North Carolina were established at or near the land-grant colleges.

In 1880 under the leadership of Prof. W. J. Beal of the Michigan Agricultural College the Society for the promotion of Agricultural Science was organized. The same year on the invitation of Prof. G. E. Morrow of the University of Illinois agricultural teachers in a number of the land-grant colleges assembled at Champaign, Illinois, and formed an association entitled "The Teachers of Agriculture". This organization held meetings at agricultural colleges in Michigan (1881), Iowa (1882), and Indiana (Purdue University, 1885). Ohio (1883), ~~and~~ New York (Cornell, 1884), Its proceedings were informal and were not published. At the meeting in 1881 there were present Professors Morrow of Illinois, Knapp and Budd of Iowa, Shelton of Kansas, Porter of Minnesota, Tracy of Missouri, Thompson of Nebraska, Georgeson of Texas, and Henry of Wisconsin.

The Washington Conventions of 1882 and 1883

On July 1, 1881 Dr. George Bailey Loring, long-time president of the New England Agricultural Society and a lecturer at the Massachusetts Agricultural College, became United States Commissioner of Agriculture. He had presided at the Washington Agricultural Convention of 1872 and had been a member of the 45th and 46th Congresses, when Senator Morrill's bills for federal aid to the land-grant colleges were pending there. Within a month after he entered the Department of Agriculture he issued a call for a series of 4 two-day agricultural conventions to meet at the Department of Agriculture at Washington January 10-18, 1882. (540) These conventions were to consider matters relating to (1) agricultural education and organizations and the principles of farming, (2) animal industries, (3) cereal crops and (4) the management of vineyards and the manufacture of wines. Delegates from the State agricultural colleges and societies were invited and 19 States were represented at the first roll call. Among those present, who were prominent in the affairs of the agricultural colleges and experiment stations, were Atwater and Gold of Connecticut, Peabody and Morrow of Illinois, Fairchild of Kansas, Fernald of Maine, Porter of Minnesota, Cook of New Jersey, Caldwell and Roberts of New York. Commissioner Loring was made chairman and H. E. Alvord (then from the private experiment station at Houghton Farm, New York) was one of the secretaries.

Professor Cook read a paper on agricultural education in New Jersey, in which he dwelt especially on the work of the experiment stations. Professor Caldwell spoke on the experiment station as the educator of the farmer and Professor Atwater described cooperative experiments with fertilizers carried on for 5 years in 9 States. A committee on cooperative experiments was then appointed which recommended that the Department of Agriculture prepare a digest of foreign experiments, endeavor to bring about cooperative experiments in this country on a carefully prepared plan and ask Congress to appropriate money for this work. Regent Peabody of the University of Illinois discussed the legitimate work of the land-grant institutions, holding that

their primary business was to teach and that their curricula should include many subjects besides agriculture and mechanic arts. In the discussion which followed reference was made to the educational bill then pending in Congress. Thereupon a committee consisting of Messrs. Roberts, Fernald and Warfield (of Maryland) was appointed to confer with Senator Morrill. Later they reported a resolution which occasioned a debate taking a political turn and which therefore was expunged from the record. The resolution was laid on the table.

A second series of 3 conventions on agricultural education, animal industry and cotton, was held at Washington January 22-29, 1883, at which 29 States and Utah (541) Territory were represented. ^ Among those present at the meeting on agricultural education were Messrs. Brewer of Connecticut, Knapp and James Wilson of Iowa, Abbot of Michigan, Folwell of Minnesota, Law of New York, and Atherton of Pennsylvania. Senator Morrill was a delegate representing the Vermont State Agricultural Society. At this meeting there was much discussion of the difficulties which the land-grant colleges were having, including the problems of student labor.

Professor W. H. Wiley, then representing Purdue University in Indiana, read an extract from an address by Dr. E. E. White, president of that institution in which he summed up the existing status of the land-grant colleges:

* * * "it may be safely said that the results actually accomplished by the national grant in the two decades now closing are not satisfactory, though promising more complete success in the future. The best results thus far attained have been in the direction of scientific training and investigation. The founding of the national schools has caused the study of science to assume new importance in all higher institutions, and a greatly increased number of students are taking the so-called scientific courses of study. Radical changes have also been made in the methods of teaching science, and enlarged facilities for scientific study and investigation have been provided.

The most unsatisfactory results are in technical training, both in agriculture and the mechanic arts. The contributions made to agricultural science have been small, and the promising work of agricultural experiment is still in its infancy, even in the institutions first organized, and in most of them it has not been seriously undertaken. Comparatively few students have taken distinctively technical or industrial courses, and the small number of well-trained technologists sent into the industries of the country is at once a surprise and a disappointment. The great majority of the students receiving either an agricultural or mechanical training are found in the few institutions which have only industrial courses of study.

It is not difficult to account for this unsatisfactory progress in industrial training and investigation. The importance of technical education for the farmer and artisan are not generally realized, and, as a consequence, the demand for such training is limited, though happily increasing. (541)

Professor Wiley read a paper on "The true relation of the sciences to the industries and arts", which led to considerable discussion regarding experimental work in agriculture. In the course of this discussion, Mr. Thomas H. Dudley, representing the New Jersey State Agricultural Society, made the following statements:

"I shall be very glad to see the time when every State in this Union shall have established an agricultural experiment station in connection with a farm for carrying on practical field experiments."

"It is a practical subject which the Government should take up; and not only the General Government, but I would be glad to see a large appropriation sufficient to establish an experiment farm and an agricultural experiment station upon it in every State, so that both might be carried on for the people of the whole State." (541)

As the final outcome of the interest in agricultural experimentation aroused in this meeting a resolution introduced by Prof. Seaman A. Knapp, at the request of President Abbot of the Michigan Agricultural College, was adopted, as follows:

"Resolved, That we indorse the bill introduced in Congress by the Hon. C. C. Carpenter, of Iowa, for the establishment of agricultural experiment stations in connection with the agricultural colleges of the several States, and we believe its early passage would greatly promote the interests of agriculture." (541)

Professor Knapp then moved that a committee of five be appointed to prepare a statement on this subject for presentation to the Committee on Agriculture of the House of Representatives. This was approved by the convention and Messrs. Knapp and Abbot, together with President Stephen D. Lee of the Mississippi Agricultural College, President Paul Chadbourne of the Massachusetts Agricultural College and President E. E. White of Purdue University were appointed on this committee.

The Carpenter and Holmes Experiment Station bills

Prior to the convention in 1883 Professor Knapp had drafted a bill for federal aid to agricultural experiment stations. C. C. Carpenter of Iowa introduced this bill in the House of Representatives in the 47th Congress (May 8, 1882) and it was referred to the Committee on Agriculture but not reported back. It was considered by the committee of the 1883 convention and with some modification was again introduced in the House by A. J. Holmes of Iowa on December 10, 1883. It was entitled "A bill to establish national experiment stations in connection with the agricultural colleges of the various States." Its text was as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to enable the Department of Agriculture to fulfill the design and perform the duties for which it was established, as declared in the organic act creating the said Department, to-wit, 'to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture in the most general sense of that word, and to procure, propagate, and distribute among the people new and valuable seeds and plants', institutions shall be established in connection with each of the agricultural colleges in the States providing such colleges, with an improved farm in connection therewith, and placed under the conduct of such colleges, to be called and known as 'national experiment stations.'

Sec. 2. That it shall be the object and design of the said national experiment stations to conduct original researches or verify experiments on the physiology of plants and animals, the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation within the isothermal limits represented by the climate of the several stations and their vicinity; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative values for raising crops of different kinds; the composition and digestibility of the different kinds of food for cattle; the scientific and economic questions in the production of butter and cheese; and all other researches or experiments bearing directly on the agricultural industry of the United States.

Sec. 3. That the said experiment stations shall be placed under the general control of the regents or trustees of said agricultural colleges, who shall have power to employ a professor for each agricultural college who shall act as superintendent of the experiment stations established under this act.

Sec. 4. That the said professors shall make such reports to the Commissioner of Agriculture from time to time as he may direct. The general character of the work and of the experiments to be performed at each station shall be determined by the Commissioner of Agriculture, the president of the college where the station is located, and the professor in charge of said station.

Sec. 5. That to each agricultural college providing for experiment stations under this act, to pay the salaries of the professors and superintendents of the said experiment stations, the wages of the laborers employed in their operations, and the cost of the experiments and researches connected with their conduct as heretofore specified, the sum of fifteen thousand dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, or so much thereof as may be necessary to cover expenditures actually made for said purposes; the money to be drawn quarterly from the Treasury of the United States, upon a certified statement of the amounts actually expended at each station, properly indorsed by the college board of audit, the professor in charge, and the Commissioner of Agriculture.

Sec. 6. That upon the passage of this act, before the agricultural college in any State can draw any funds as provided, the legislature of such State shall pass an act accepting such trust and agreeing to conduct an experiment station in accordance therewith." (72)

As chairman of the committee and president of the Iowa Agricultural College Professor Knapp issued a circular, ⁽⁷²⁾ in which he briefly stated the history of the bill, gave the names of the committee appointed by Commissioner Loring, presented reasons for establishing agricultural experiment stations in the several States because of the diversity of their climate and agricultural production and the broad range of problems to be solved, as well as the desirability of aiding the Department of Agriculture in its researches and in obtaining useful seeds and plants for distribution in different parts of the country. He thought the stations should be connected with the agricultural colleges because (1) it would be economical to take advantage of their organization, faculties, buildings and equipment and (2) the investigations would greatly benefit the students "as object lessons and would perfect and give practical value to the work of the colleges, as contemplated in the original law creating them." The supervision to be exercised by the Commissioner of Agriculture "will systematize their work throughout the United States and will avoid too much repetition of experiments at different stations."

From this time the efforts of the friends of agricultural education in the land-grant colleges, the agricultural societies, the Grange and other organizations were concentrated on securing the passage of an experiment station act by Congress.

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The Holmes bill was not generally acceptable to the colleges largely because it seemed to make the stations virtually branches of the Department of Agriculture and put them to a considerable extent under the control of the Commissioner of Agriculture. It was therefore remodeled and when it had been considered and modified by the Committee on Agriculture of the House of Representatives it was favorably reported from that committee by Mr. Cullen of Illinois July 2, 1884. It was still a bill (H. R. 7498) to aid the Department of Agriculture in acquiring and diffusing agricultural knowledge but the stations were to be distinctly departments of the land-grant colleges and under the control of their governing bodies and were to make their reports to the governors of the States. It was expressly provided that nothing in the act "shall be construed to authorize said Commissioner to control or direct the work or management of any such station except as to the standard of valuation of commercial fertilizers." He might furnish forms for the tabulation of results of experiment, indicate lines of inquiry and "in general furnish such aid and assistance as will best promote the purpose of this act." Sections were added which required the stations to publish and distribute bulletins every three months, gave them the franking privilege for their publications, and required the trustees of the colleges to agree to spend the Federal money according to the provisions of the act, to maintain a farm of at least 25 acres and to give a bond "for the faithful expenditure and accounting for all moneys so received." One fifth of the first year's appropriation might be spent for the erection, enlargement or repair of station buildings but only five per cent thereafter. If any money was not expended during the fiscal year of its reception, that amount was to be deducted from the next annual appropriation. Nothing in the act was to impair or modify the legal relation between the college and the State. A group of college presidents were in Washington in the winter of 1884-85 to forward the passage of this bill but Congress was not ready to take action.

The Washington Convention of 1885

Dr. Loring's administration of the Department of Agriculture came to an end March 3, 1885. He was succeeded by Norman J. Colman of Missouri, who as editor of the Rural World and member of the State Board of Agriculture, had for many years shown his friendship for agricultural education and research. On May 6, 1885 he issued a call for a convention of "representatives of the different agricultural colleges and allied State institutions" to consider cooperation with the Department in the work of the experiment stations, the best means for bringing about Congressional action, and other cognate questions.

This convention met July 8, 1885, and was organized under the presidency of
(542)
Commissioner Colman. At least 28 States and 3 Territories were represented. Among the men prominent in promoting the work of the colleges and stations were President Atherton of Pennsylvania, Professor Armsby then of Wisconsin, H. E. Alvord of the Houghton Farm Station in New York, Professor Cook of New Jersey, Dr. Dabney of North Carolina, President Fernald of Maine, President Fairchild of Kansas, Professor Goessmann of Massachusetts, Mr. Gold of Connecticut, Professor Knapp of Iowa, President Lee of Mississippi, Professor Roberts of New York, Professor Townshend and C. E. Thorne of Ohio, and President Willits of Michigan. A committee on order of business and resolutions, consisting of Messrs. Alvord, Lee, Knapp, Fernald, Atherton, Willits and Dabney, largely determined the business of the convention. Its resolution regarding the experiment station bill, introduced early in the session and unanimously adopted, was as follows:

"Resolved, That the condition and progress of American agriculture require national aid for the investigation and experimentation in the several States and Territories, and, therefore, this convention approves the principles and general provisions of what is known as the Cullen bill of the last Congress, and urges upon the next Congress the passage of this or a similar act." (542)

There was much discussion regarding cooperation of the Department and the stations. A series of resolutions on this subject, proposed by the committee on business, was adopted with amendments. This recommended the department to create a

division of intercommunication and exchange between the colleges and stations, which would have charge of the details of cooperation, issue a periodical bulletin on "the progress of agricultural education, investigation and experimentation in this and in all other countries", and issue uniform blanks for reports of the operation of the schools and experiments. It was also resolved to petition Congress for the necessary funds to carry out this plan. A committee on legislation consisting of Messrs. Atherton, Willits and Lee was appointed. Near the end of the convention an advisory committee consisting of one representative from each State and Territory and the Department of Agriculture was appointed. President Atherton was elected its chairman and was authorized to choose five other members, who with him would constitute an executive committee to determine the time and program of the next convention and a plan for permanent organization. He selected Messrs. Cook, Knapp, Peabody, Curtis (Texas) and Newman (Alabama).

The Hatch Experiment Station Act

The committee cooperated with Commissioner Colman in securing the interest of William H. Hatch of Missouri in the experiment station bill and at the next session of Congress he introduced it (in somewhat modified form) on January 7, 1886, when it was referred to the Committee on Agriculture of which he was chairman, (See Proceedings Asso. of Land Grant Colleges and Universities, 1926) and reported back favorably March 3, 1886. The State stations not connected with the land-grant colleges felt very strongly that they should participate in the benefits of this act. Under the leadership of J. H. Brigham, president of the Ohio State Board of Agriculture and Master of the State Grange and with the aid of Senator John Sherman of Ohio an amendment was secured in the Senate which was embodied in Section 8 of the Hatch bill, as follows:

"That in States having colleges entitled under this section to the benefits of this act and having also agricultural experiment stations established by law separate from said colleges, such States shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established, under the provisions of said act of July second aforesaid, an agricultural department or experimental station in connec-

tion with any university, college, or institution not distinctly an agricultural college or school, and such State shall have established or shall hereafter establish a separate agricultural college or school, which shall have connected therewith an experimental farm or station, the legislature of such State may apply in whole or in part the appropriation by this act made to such separate agricultural college or school, and no legislature shall by contract, express or implied, disable itself from so doing."

It is also interesting to note that while the Carpenter and Holmes bills provided for a direct appropriation from the Treasury the Hatch bill stipulated that the station fund should come from the sales of public lands, thus following the precedents set in the educational bills which had been before Congress during the previous fifteen years. Senator George of Mississippi had much to do with the perfecting and passing of this bill.

The Hatch Act became a law March 2, 1887. To the surprise of many who had not followed this legislation closely it was soon discovered that in this act Congress had only authorized, but had not made an appropriation. This caused some difficulties in carrying the work of stations already established. In Ohio for example the legislature supposing that the station would be sufficiently supported with the federal fund neglected to make the usual State appropriation. The first appropriation under the Hatch Act was made in 1888 and at that time a precedent was established, which has since been followed, of including this fund in the annual appropriation act for the Department of Agriculture.

The Organization of the Association of American Agricultural Colleges and Experiment Stations

The executive committee appointed at the Washington convention of 1885, which had actively promoted the passage of the Hatch Act, saw that many problems would arise regarding the interpretation and administration of this act, the relations under it of the land-grant colleges, experiment stations and Department of Agriculture, and the more comprehensive organization and management of experiment stations in all the States and Territories. President Atherton, as chairman of this committee, therefore called a meeting of representatives of the colleges and stations, which met at Washington, October 18-20, 1887. (635)

At this meeting the Association of American Agricultural Colleges and Experiment Stations was organized and the constitution proposed by the executive committee was adopted with few amendments.

Name

This Association shall be called The Association of American Agricultural Colleges and Experiment Stations.

Object

The object of this Association shall be the consideration and discussion of all questions pertaining to the successful progress and administration of the colleges and stations included in the Association.*

Membership

At any regularly called meeting of the Association each college established under the act of Congress approved July 2, 1862, and each experiment station established under State or Congressional authority, and the Department of Agriculture, shall be entitled to one delegate; but no delegate shall cast more than one vote. Other institutions engaged in experimental work in the interest of agriculture may be admitted to representation in this Association by a majority vote at any regular meeting of the Association.

Officers

The officers of this Association shall be a president, five vice-presidents, and a secretary, who shall act as treasurer. They shall be chosen by ballot, and shall perform the duties which usually devolve upon such officers. They shall hold office from the close of the meeting at which they were elected and until their successors shall be elected.

The president, secretary, and five persons, to be chosen by the Association, shall constitute an executive committee, which shall elect its own chairman.

The executive committee shall determine the time and place of the next meeting of the association; shall issue its call for said meeting, stating the general purpose thereof, not less than thirty days before the date at which it shall be held; shall provide a well-prepared order of business and programme of exercises for such meeting, and shall make seasonable issue of said programme.

It shall be the duty of each institution included in this Association to present, at each regularly called meeting, a brief report of the work and progress of said institution, and such report shall be called for in the regular order of business.

The executive committee shall be charged with the general arrangement and conduct of the meeting called by it; at which meeting, before its adjournment, a new executive committee shall be chosen.

Amendments

This constitution may be amended or changed at any regularly called meeting by a vote of two-thirds of the delegates present.

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In 1890 the Office of Experiment Stations was made a member of the association with a voting delegate.

President Atherton of Pennsylvania was elected first president of the association, and Charles E. Thorne of Ohio, secretary and treasurer. The executive committee included Henry E. Alvord of Massachusetts, Edwin Willits of Michigan, James K. Patterson of Kentucky, Charles W. Dabney of Tennessee, Charles K. Adams of New York, and Charles E. Thorne of Ohio.

The form of organization adopted in the Association of American Agricultural Colleges and Experiment Stations has greatly promoted continuous and effective efforts for the improvement of the educational and material conditions of the land-grant institutions. The annual conventions have afforded a broad basis for personal contacts of leading officers of these institutions and the Federal departments dealing with their affairs and for the discussion of many important problems relating to the organization and work of the institutions represented in the association.

The executive committee with broad authority to act during the intervals between conventions, as well as temporary and standing committees for the consideration of different phases of the work of the colleges and stations, have been able to keep the association in continuous action in many important ways.

The inclusion of members from Federal departments in the conventions and committees of the association has had many advantages. This is particularly true with reference to agricultural education and research, in the promotion of which the United States Department of Agriculture, and especially the Office of Experiment Stations, established October 1, 1888, cooperated actively and effectively.

The proceedings of the association at its annual conventions for 21 years, (1889-1909), were published as bulletins of the Office of Experiment Stations, thus insuring their regular appearance and distribution, as well as official sanction.

Summaries of these proceedings and other information about the educational work of the colleges were also given in Experiment Station Record.

One of the first pieces of work which this Office undertook in 1888-89 was the collection of information, documents and photographs from the agricultural colleges for a report and exhibit at the Paris Exposition of 1889. There were thus brought together, though imperfectly, considerable data regarding the history and status of these institutions and in this way their appreciation of the fact that they collectively constituted an unique system of agricultural education with great possibilities was considerably strengthened.

Through the united efforts of Federal and State forces represented in the association, there came about a general movement for the accumulation of new agricultural knowledge, its reduction to pedagogical form, the enlargement of agricultural faculties, the broadening and specialization of agricultural courses, the securing of better and more adequate buildings, apparatus, and other equipment, and much wider and more effective measures for enlisting the confidence and support of the agricultural people and giving them aid and information which they greatly appreciated.

In the conventions of the association for the first decade after the preliminary meeting at Washington in 1885 questions relating to the funds, organization and work of the experiment stations naturally occupied a large place on the programs and in the discussions. However from the beginning educational problems were more or less discussed and gradually arrangements were made for their orderly and continuous consideration. At the convention of 1885 the problem of student labor was much discussed. It was quite evident that this was not bringing the results its advocates had hoped for and there was ^{an} apologetic tone in the statements of those who defended it.

At Knoxville, Tenn., January 1, 1889, Judge Temple, representing the University of Tennessee, in an address of welcome to the association, pointed out some of the reasons why the friends of the new education had been disappointed in the work

of the land-grant colleges. Among these were the following: (1) Lack of sympathy of the industrial classes. The farmers do not want book learning but when they send their sons to college they object to labor on the college farms and prefer to have them study for the learned professions: (2) Difficulty of getting trained professors in the new line; (3) Inadequate funds - often none from the State; (4) Trustees, especially in the old colleges, do not understand the requirements for vocational instruction and think that one or two professors in these lines with ill-defined duties and no equipment are all that is necessary; (5) The secret opposition of literary faculties.

In the discussions during this meeting much stress was laid on the use of methods for personal contact with farmers through institutes, correspondence, etc., in order to acquaint them with work of the colleges and make them feel that they were being benefitted thereby.

At the Washington meeting in November, 1889, the relations of the stations to the educational work of the colleges was much discussed. In his presidential address Dr. Atherton of the Pennsylvania State College summed the matter up as follows: "Let the college investigate that it may teach well and the station teach that it may investigate."

At this meeting an amendment to the constitution of the association was adopted which provided for permanent committees and a committee on college work was appointed out of which was developed in 1890 a section on college work.

The Morrill Land-Grant College Bills of 1890 (See also p. 540)

On March 25, 1890, Senator Morrill introduced a bill (S. 3256), which had the same title as previous bills but in which the allotment to the land-grant colleges of one-half of the educational fund accruing from the proceeds of public lands and railroads was made more prominent by being placed ahead of the common-school grant. (714) The college fund was to be permanent with interest at 4 per cent, which was to be given in equal shares to each State and Territory up to a maximum of \$25,000 annually.

the remainder going to the common schools. This was the first indication that Senator Morrill did not consider the connection of the land-grant college grant with that to common schools so important as he had hitherto.

He now had the active assistance of the executive committee of the agricultural college association and "with the hearty concurrence of Senator Blair" the college bill was rewritten and again introduced April 30, 1890. It was now a bill "to apply a portion of the proceeds of the public lands to the more complete endowment and support" of the land-grant colleges. It carried an appropriation of \$15,000 to each State and Territory and an annual increase of this sum by \$1,000 for ten years, after which the annual appropriation would be \$25,000.. No distinction of race or color was to be made in the admission of students, but where separate colleges for white and colored students were maintained this would be considered a compliance with the act provided the fund was equitably divided between the two races. Reports of finances and work were to be made annually to the Secretaries of Agriculture and the Interior. None of the Federal fund was to be spent for the purchase, erection, preservation or repair of buildings. The Secretary of the Interior was charged with the administration of the act.

This bill was referred to the Committee on Education and Labor, of which Senator Blair was chairman, and was favorably reported by him, with amendments, May 17, 1890. "After being discussed at length for three days and considerably amended the bill passed the Senate June 23 by a practically unanimous vote." (640)

The next day it was read in the House of Representatives and referred to the Committee on Education, by whom it was favorably reported, without amendment, on July 12. Under a special order it was considered August 19 and passed in the House, with one amendment, by a vote of 135 to 39. The Senate concurred in the amended bill on August 20. The amendment adopted in the House restricted the use of the federal funds to the teaching of "agriculture, the mechanic arts, the English language, and the various branches of mathematical, physical, natural and economic

science, with special reference to their applications in the industries of life and to the facilities for such instruction." It was prepared by the Executive Committee of the association to meet the views of the National Grange on this matter.

The act was approved by President Harrison, August 30, 1890.

Opposition to the use of any available money in the United States Treasury for the benefit of the land-grant institutions gradually died out and in an act of May 17, 1900, providing for free homesteads on the public lands, it was expressly declared that if the proceeds of the sales of public lands shall not be sufficient to meet the payments "provided for agricultural colleges and experimental stations" by the act of August 30, 1890, "such deficiency shall be paid by the United States."

Work of the Association of American Agricultural Colleges and Experiment Stations relating to agricultural education

The Morrill bill of 1890 was not brought to the attention of the individual colleges or their association until after its introduction by Senator Morrill. The executive committee of the association, of which Henry E. Alvord was chairman, then worked actively in its support and was assisted by representatives from most of the colleges. Coming so soon after the passage of the Hatch Act, the second Morrill act greatly strengthened the educational work of the land-grant colleges. Encouraged by this new recognition of the value of these colleges by the Federal Government, the State legislatures were more easily led to make liberal appropriations for buildings and facilities for instruction in these institutions. The friends of agricultural education became more active in urging their claims upon faculties, boards of management and legislatures, and met with increasing success in securing for agriculture a larger recognition in the college curriculum. The establishment of the experiment stations had attached to these colleges a much larger and stronger body of men whose prime interest was on the side of agriculture, and the increased financial revenues of the colleges made it possible to utilize the service of many more instructors in agricultural subjects. The economic condition of agricul-

ture did not, however, favor an immediate increase in the number of agricultural students, or tend to hold those who began agricultural studies until they had completed the four years' course.

The Section on College Work of the association reported at the New Orleans meeting in 1892 that engineering courses were much more popular than those in agriculture. In Illinois, for example, there was that year a decrease of 11 students in agriculture and an increase of 50 in mechanic arts. In Indiana there was an increase of 15 in agriculture but of 87 in engineering. Many colleges were erecting buildings for mechanic arts. At this meeting Professor Henry of Wisconsin urged that there should be greater specialization of instruction in agriculture, that it should be made more practical and that short courses should be organized to attract agricultural students and meet the actual needs and conditions of a large body of farm youth. He had already ^{had} considerable success in these directions, having organized at the Wisconsin College a short course in 1886 and a dairy school for the practical instruction of men to manage creameries and cheese factories. (See p.275)

As announced by the University of Wisconsin,

"The short course in agriculture is designed to meet the wants of young farmers who desire practical, helpful instruction in agriculture before taking up their chosen vocation. This course covers two terms of twelve weeks each, beginning the first of January each year. It includes lectures on feeds and feeding, breeds of live stock, agricultural chemistry, agricultural physics and meteorology, plant life, veterinary science, dairying, farm bookkeeping, horticulture, agricultural economics, and bacteriology. Laboratory practice is given in dairying, physics, plant life, stock judging, and horticulture, and practical work in chemistry and blacksmithing. The dairy course occupies one term, and includes theoretical and practical instruction in the science and practice of dairying and dairy farming. It is definitely planned to meet the needs of persons intending 'to operate creameries and cheese factories', and has been very successful in training men competent for work of this kind. The students engage in milk testing, operate separators and butter extractors, and attend to the ripening of the cream, churning and packing butter, and all the operations of a creamery and cheese factory." (2d Annual Announcement of the Short Course in Agriculture at the University of Wis. by W. A. Henry, Madison, 1887)

By 1899 the dairy school had sent out about 800 trained butter and cheese makers and had also taught nearly 2,000 young men butter-making on the farm. That year the short course in agriculture was reported to have 190 students in attendance, and as a practical outcome the dean stated that "we have found places on farms this year for more than fifty young men, who will secure from \$2 to \$10 per month more because of their training with us."

There had previously been many attempts to conduct short courses in agriculture but as long as the four years' course was a simple and rigid curriculum, shorter courses on the same general plan, but more superficial and imperfect in detail did not prove generally successful. It was difficult for the outside public to distinguish between the two courses, which led the long-course students to think that their standing as college men was imperilled by misunderstanding regarding their status as compared with that of the short-course students. While the pedagogical character of the long course was as a rule nondescript, that of the short course was still more so.

In 1888 the University of Minnesota took an important step by establishing in connection with its Department of Agriculture, but as a distinct organization, a School of Agriculture of secondary grade, with a two-years' course.

This school had a principal and several special teachers of academic subjects and agriculture was taught by members of the experiment station staff. It was immediately successful and in 1890 had 78 students, with a graduating class of 14 members. In the college course on agriculture in 1892 there were only one freshman and two sophomores while in the School of Agriculture there were 115 students. (For further account of this school see p.780).

At the New Orleans meeting of the association in 1892 there was much discussion about the agricultural curriculum. President Fairchild of the Kansas Agricultural College in a paper on "The Relations of technical to general courses of study" gave the plan followed at his institution - (1) Admit directly from the common schools;

(2) Give as early as possible, with English and mathematics, an introduction to nature through drawing and botany, with mechanical training in simple construction; (3) With chemistry and mineralogy apply science in agriculture, horticulture, economic entomology, and household economy, with practice in all; (4) With mathematics, mechanics, agricultural chemistry, and physics, give training in surveying and common engineering; (5) Give general problems in thinking and reasoning, illustrated by everyday facts and practice in the arts of construction and production; (6) Keep students thinking along the line of the industries; (7) Make the faculty a unit in their sympathy for the purpose and methods of the college; (8) Interest the students in the objects and arouse their pride in the college; (9) Bring the college to the people; (10) Cultivate the interest of the alumni.

Prof. S. W. Johnson, of Connecticut, favored a fundamental course in the sciences underlying both agriculture and the mechanic arts, with instruction in greenhouses, laboratories, shops and barns and a postgraduate course for special training. Prof. W. M. Hays, then from North Dakota, called attention to the specialization of agricultural education in the colleges in Michigan and Wisconsin, the dairy schools in Wisconsin and Minnesota, and the secondary school of agriculture in Minnesota.

Prof. P. M. Harwood of Michigan argued for the organization of agricultural instruction in one college department with assistants in "vegetable economy and animal industry." At the Michigan College the freshmen had instruction on breeds of live-stock, the sophomores on field crops, the juniors on animal husbandry and the seniors on special agricultural subjects. Student labor was made educational by making it experimental.

The statistics of the land-grant colleges in 1894 as published in Circular 27 of the Office of Experiment Stations showed that 17 colleges had less than 25 students in agricultural courses, 13 had less than 75 and 6 less than 150. The States in which there were more than 150 students were Kansas with 460, Mississippi 216, Massachusetts 204, Texas 187, Michigan 181, Iowa 179 and Minnesota 175.

In these statistics there was no differentiation of students in long and short courses. The total number of students in agricultural courses in all the land-grant colleges that year was 3,847 and the number of graduates was 229. Fourteen colleges had no graduates in agriculture, 20 had less than 5, 4 had less than 10 and only 8 had over 10. The latter included Alabama with 12, Kansas 39, Massachusetts 34, Michigan 14, Minnesota 20, Rhode Island 12 and Wisconsin 20.

In 1893 at Chicago Professor Henry of Wisconsin, in his presidential address before the association urged division of labor as regards teachers and investigators. The latter should do only a little teaching of advanced students. At that year's meeting the Chicago Exposition largely engrossed the attention of the association. The cooperative exhibit of the agricultural colleges and experiment stations, with the Office of Experiment Stations, did much to strengthen the feeling of unity of interest in the nation-wide system of agricultural education and a desire to do more to promote its improvement.

At the Washington meeting in 1894 there was great interest in the plans of the Department of Agriculture with reference to the supervision of the Hatch fund, which had been given to it by Congress at the request of Secretary Morton. The inspection of the work and finances of the stations inaugurated that year by the Office of Experiment Stations had unexpected results as regards agricultural instruction. The annual visits to the stations were made for a number of years by the director and assistant director of the office. They were thus enabled not only to discover what relations existed between the stations and the teaching departments of the colleges but also to learn much about the status of agricultural instruction in these institutions. At that time they were often called in conferences with boards of trustees or their committees, presidents and heads of departments, especially at the younger colleges, and were consulted about the qualifications of teachers, courses of instruction and equipment for agricultural teaching, as well as about station affairs. The Office of Experiment Stations was thus put in a position to aid the movement for agricultural education in a broad way.

In 1894 the association also opened the way for a systematic study of educational problems. In his address as acting president, Professor Morrow of Illinois, deplored the lack of of agricultural students due to the economic depression of agriculture and pointed out the need of making agricultural courses more attractive through studies on methods of teaching and the devising of improved apparatus. He (See p. 557) referred to the informal society which he and other teachers of agriculture had formed and kept up for several years before the national association of agricultural colleges was organized and said that Professor Hunt of Ohio had written him that something ought to be done to systematize instruction in agriculture.

Dr. W. T. Harris, United States Commissioner of Education, speaking at this meeting also laid stress on reducing agriculture to pedagogical form.

Report of the Committee on Entrance Requirements

Dr. A. W. Harris, then president of the Maine State College, on behalf of the Section on College Work, brought about the appointment of a committee of 5 members on entrance requirements.

The committee was Charles S. Murkland of New Hampshire, Abram W. Harris of Maine, George W. Atherton of Pennsylvania, J. M. McBryde of Virginia and Thomas F. Hunt of Ohio. The final report of this committee was made in 1896. (657) This took the general position that Congress intended that the land-grant institutions should be "collegiate in scope" and that their work under the act of 1862 "should be as far as practicable uniform in scope and character in the different States and Territories" though it might be "somewhat limited or conditioned by the environment of each college."

"The steadily increasing tendency to ignore and obliterate all State lines in scientific and educational work; the free intercourse in social and industrial life among the people of the several States, and, in consequence, the steadily broadening field of usefulness and activity open to the graduates of educational institutions; the association of the land-grant colleges into a national organization for the protection and promotion of their common interests; the increasing recognition by the National Government of the importance and promise of the work of these colleges - all these considerations made it desirable that the degree or degrees awarded by these colleges should represent work approximately uniform in character and scope; should be, in other words, degrees of such recognized value as to pass current, each the equivalent of the others, in any State or Territory." (657)

The defective school system in some States made it impossible for the time being "to prescribe uniform requirements for admission into the colleges of this class." But the colleges should protect "their standards of work and graduation" by special efforts and through educational work within the institution. Since it was not practicable for students in the United States to get liberal training in preparatory schools the colleges "must include in their courses for graduation certain elements of a liberal (or general) education", along with technical subjects.

On the foregoing basis, the committee recommended that colleges in the association "should unite in requiring for the bachelor's degree, or degrees, at least the following general studies:

- Mathematics - At least through algebra, geometry, and trigonometry.
- Physics and chemistry, with laboratory work in each.
- English language and literature - At least two years' work.
- Other languages (one, at least, modern) - Four years.*
- Mental science and logic or moral science. - One year.
- Constitutional law.
- Social, political, or economic science - One year.

As regards amount of work it was thought that "it is not too much to require the equivalent of fifteen hours per week of recitations and lectures, together with ten hours per week of laboratory work or practicums, including the time devoted to military science and drill. Upon this basis, the above-mentioned general studies should be assigned a relative importance approximately as follows:

	Hours		Hours
Algebra -----	75	Modern languages -----	340
Geometry -----	40	Psychology -----	60
Trigonometry -----	40	Ethics or logic -----	40
Physics (class-room work)---	75	Political economy -----	60
Physics (laboratory work)---	75	General history -----	80
Chemistry (class-room work)-	75	Constitutional law -----	50
English -----	200		
Chemistry (laboratory work)	75	Total -----	1,285

The total number of hours included in a four years' course, allowing fifteen hours per week for thirty-six weeks, would be 2,160; with ten hours' laboratory work or practicums added, 3,600. In general terms, therefore, the foregoing general studies should comprise about two-fifths of the work required for a bachelor's degree.

* The statement "four years" means 340 hours. These may be distributed over four, three, or two years, or confined to one year. (657)

Only the degree of bachelor of science should be conferred for a technical course of four years but the diploma might indicate the particular kind of course pursued, e. g., engineering, chemistry, etc.

Recognizing the differences in the character of the school systems in the several States the committee suggested standard and minimum requirements for entrance. The standard requirements included:

- (1) Physical geography
- (2) United States history
- (3) Arithmetic, including the metric system
- (4) Algebra, to quadratics
- (5) English grammar and composition, together with the English requirements of the New England Association of Colleges and Preparatory Schools
- (6) Plane geometry
- (7) One foreign language
- (8) One of the natural sciences
- (9) Ancient, general, or English history

For minimum requirements the first five subjects in the standard requirements were suggested.

At this meeting a paper by President J. E. Stubbs of Nevada University showed that out of 46 colleges reporting 30 had preparatory departments and as regards entrance requirements 18 had standard high school requirements in English, while 28 required only work done in eighth or ninth grades of elementary schools; 38 required arithmetic; 34 algebra to or through quadratics; 46 history of United States; 20 at least part of plane geometry; and 8 a reading knowledge of French or German; physics, chemistry, botany or physiology was required in from 8 to 17 colleges.

Organization and work of the Committee on Instruction in Agriculture

The report of the committee on entrance requirements formed a basis for the work of the committee on methods of instruction in agriculture which was established by the association in 1895. The appointment of this committee was preceded by discussion on what studies should be embraced in the four-years'

course for the degree of bachelor of science. President Ellis of Colorado favored a cultural course in literature, mathematics and the sciences, and Professor Hilgard of California thought the land-grant colleges should make their degree courses of high scientific grade as their main object should be to train leaders and teachers, but courses in agriculture of lower grade should be provided in secondary schools or in the colleges.

Professor T. F. Hunt of Ohio in a paper on methods of teaching agriculture expressed a preference for text-books rather than lectures but thought that students should have practice in agricultural operations which they did not know before coming to college. (672) The report of the section on college work showed that changes in curriculum and additions to agricultural faculties were proceeding in the colleges and "indicates its interest in agricultural work by discussing means for increasing attendance in agricultural courses." The association was thus prepared to consider favorably some regular method of promoting agricultural instruction in the colleges and readily adopted a proposition advanced by Professor Connell of Texas for the appointment of a committee on methods of instruction in agriculture and passed the following resolution:

"That a standing committee of five be appointed, whose duty it shall be to report annually upon the best methods used in the various colleges of the world for the instruction of students in the practical and scientific facts relating to agriculture with a view to bringing instruction in agriculture into pedagogic form." (635)

The committee appointed was J. H. Connell of Texas, A. C. True of the Office of Experiment Stations, T. F. Hunt of Ohio, H. T. French of Idaho and H. H. Wing of New York.

The Office of Experiment Stations cooperated actively with this committee. The Director of that office became secretary of the committee and from 1902 its chairman. The first report of this committee was presented to the association at its meeting in Washington, November 11, 1896. (683) Data regarding the status of agricultural instruction in the United States had been collected from about 50

colleges. It was thus

"plainly shown that there exists at present in this country no standard for instruction in agriculture. There is a bewildering variety as regards the topics taught, the time devoted to each topic, the order in which the different topics occur in the course, the relative amounts of class-room work and laboratory or practical exercises, etc. Granting all that ought to be conceded because of local conditions, it is nevertheless obvious that general progress in the teaching of agriculture in college courses can hardly be expected until there is greater uniformity in planning and conducting the course of study in this subject."

"One great obstacle to the intelligent discussion of the scheme of agricultural instruction and the methods of agricultural teaching is the lack of a definite nomenclature of the subject. This confusion of terms is evident in the data collected by the committee, as well as in much of the current discussion of this subject which appears in the public prints." (683)

To aid in removing this difficulty the committee proposed a tentative classification of the subjects commonly taught under the head of agriculture, as follows: (683)

Agriculture	(1. Agronomy, or agriculture (technical)	(Climate, soils, fertilizers, & crops-plant production.
	(2. Zootechny, or animal industry	(Animal physiology and animal production.
	(3. Agrotechny, or agricultural technology	(Agricultural industries, e.g., dairying, sugar making.
	(4. Rural engineering, farm mechanics, or farm equipment	(Roads, drains, irrigation systems, farm buildings, etc.
	(5. Rural economy, or farm management	(General policy of farm management, rural law, agricultural book-keeping, etc.

The committee had also examined the courses in agriculture in foreign institutions, its secretary had visited a number of agricultural schools in Germany, France, Belgium and Holland and Professor Woll of Wisconsin had done similar work in Denmark, Norway and Sweden. The report with its accompanying papers was published in Circular 32 of the Office of Experiment Stations. It shows that in many of our colleges the professor of agriculture or his assistant taught all that was included under agronomy and zootechny, to which were added dairying in 15 colleges, farm engineering in 17 and rural economics in 14.

That year the Section on Agriculture and Chemistry reported that in 35 land-grant colleges there were only 117 instructors in agriculture, of whom 48 were assistants, and 36 colleges had 2,963 students in agricultural courses, of whom 1,355 were in the long courses, 237 in a two years' course, 1,238 in short courses and 113 in graduate work.

In 32 colleges there were 61 instructors in agricultural chemistry, of whom 23 were assistants. Twenty-five of these colleges had 925 students in agricultural chemistry as a special subject, outside the regular agricultural course.

In its second report, in 1897, the committee on instruction in agriculture suggested that on the basis of the previous report of the committee on entrance requirements with reference to the mathematics, sciences, languages, and other cultural subjects to be included in a four years college course, there should be added the following subjects in the course in agriculture leading to a bachelor's degree:

	Hours
Agriculture -----	486
Horticulture and forestry -----	180
Veterinary science, including anatomy -----	180
Agricultural chemistry, in addition to general requirement --	180
Botany (including vegetable physiology and pathology) -----	180
Zoology (including entomology) -----	120
Physiology -----	180
Geology -----	120
Meteorology -----	60
Drawing -----	60
Total -----	1,746

Under agriculture the following division of time among the main branches was proposed:

	Hours
1. Agronomy, or plant production -----	132
2. Zootechny, or animal industry -----	162
3. Agrotechny, or agricultural technology -----	72
4. Rural engineering, or farm mechanics -----	60
5. Rural economics, or farm management -----	60
Total -----	486

In three following reports the committee gave in some detail syllabi of courses in agronomy, zootechny, dairying, rural engineering and rural economics.

535

In its fourth report the committee pointed out that "the arrangement of the topics to be taught under each head in a logical and pedagogical order has been deemed of fundamental importance", though this might be a different order from that followed in existing manuals.

"It makes little difference whether some unfortunate 'professor of agriculture' is compelled to bear the heavy burden of guiding the student through the entire course or whether numerous specialists give their combined energies to the task. * * * But on the other hand, we are inclined strongly to contend that in the courses in agriculture a comprehensive scheme of instruction should be adopted, and that all the topics should be included which are necessary to a clear understanding of the proper relations of the different parts of the subject. We hold that there is such a thing as a science of agriculture, secondary and complex in its nature, and deriving its facts and principles very largely, if not wholly, from other more primary sciences, but after all to be differentiated as a distinct entity from the other sciences, however dependent it may be on them for its materials. And we urge that one radical defect of agricultural instruction thus far has been that so much of the teaching of agricultural subjects has been done in a disjointed way by experts in different branches of science. The student has therefore often not had the subject of agriculture presented to him as a connected whole with related parts, and has for this reason failed to appreciate that there was any such thing as a science of agriculture, or has not learned to make any useful application of what he has learned in various sciences to either the theory or the practice of agriculture. Thus, we believe, for example, that however much the student may have learned or will learn about the physiology of plants, or the physics of soils, or the chemistry of fertilizers, at some period in his agricultural course he should have all these subjects grouped together in a course in agronomy and there learn their relation to each other and to the methods employed in the production of crops in actual agricultural practice. * * * If generally and efficiently taught in our colleges it will do much to counteract the pernicious influences of a narrow specialism which has in recent years been fostered by a false eclecticism. This requires, however, that agriculture in its scientific and practical aspects shall be treated as a distinct entity and not be hopelessly dismembered in the scheme of college instruction." (706)

While these reports were tentative and crude in many particulars and represented in the usual way compromises of statement growing out of differing views of members of the committee they laid the foundation for a wide discussion on agricultural courses in the colleges and did much to strengthen the position of the teachers of agriculture as distinct from the sciences related thereto. They also helped to increase the specialization of agricultural instruction, enlarge the agricultural faculties, and secure more ample equipment of buildings, land, livestock, apparatus, etc. for this work.

Agriculture as a subject of college instruction was thus helped to outgrow its subordinate place in the curriculum and the agricultural course became much more than the teaching of the relations of the sciences to agriculture.

The change in the point of view of college officers and teachers with reference to agricultural instruction was reflected in the papers and discussions at the meetings of the Agricultural College Association in the closing years of the nineteenth century. For example, President Fairchild of Kansas, as president of the association, in 1897 delivered an address on the Evolution of Agricultural Education in which he said that it had passed through two stages, (1) education for agriculture, and (2) education in agriculture. In the first stage agricultural students had for the most part the ordinary college course, to which were added some of the applications of chemistry and botany to agriculture, and of mathematics to land surveying, along with a certain amount of manual labor. Then came the professor of agriculture but at first he was able to give only a body of information about agriculture and this information was largely based on theory rather than on ascertained facts. To remedy this practical farmers were often called to fill this professorship but their instruction was superficial and unsatisfactory. Gradually a body of agricultural knowledge was being collected by research and experimentation and there was great activity at the college in developing facilities for experimental inquiries, and the employment of experts to conduct such work in many lines. "The evolution of agricultural education to the stage of education in agriculture is fairly recognized by the establishment of machinery for expert training in truly agricultural science in nearly every State of the Union." (661) But there must be a broader system of agricultural education which will affect the great body of farmers. "We must solve the problem of combining learning and labor, without confining the learning to the top stratum. * * * We are ready for the third stage of our evolution in education in agriculture." (661)

In 1898 President Ellis of Colorado, in a paper on "Some General Considerations Regarding the Work of Agricultural Colleges", also held that these institutions should teach agriculture itself as well as the sciences related thereto. More interest was being taken at this time in instruction in horticulture and in the development of this subject as distinct from botany. The facilities for instruction were increasing rather rapidly. In 1897 24 States reported from 1 to 5 greenhouses used for instruction and in a few States special attention was being given to the development of laboratory work by students.

In botany work in physiology and pathology was being developed, though in 1896 Professor Stone of Massachusetts said that American botanists for the most part were busy with systematic work and that the facilities for instruction in vegetable physiology were meager. Previous to 1890 only 3 or 4 American botanists had studied plant physiology in foreign universities but since that time "something like a dozen" had done so, with the result that instruction in this subject had received quite an impetus in both colleges and secondary schools.

The need of more than an undergraduate course for the training of experts in agricultural and scientific subjects was beginning to be appreciated and some of the stronger colleges began to have quite a number of graduate students. For several years prior to 1900 the association had a committee that endeavored to secure some arrangement by which graduates of the land-grant colleges might make use of the special facilities for study and research in the Government establishments in Washington. At one time it seemed as if this might be aided through an office in the Smithsonian Institution but finally the authorities there decided this would contravene their established policy of not engaging in educational activities.

The United States Department of Agriculture undertook in 1899 to aid this movement by establishing in cooperation with the Civil Service Commission a register of Scientific Aids, which would enable graduates of colleges having proper qualifications to earn a small salary for work in different bureaus, with the understanding that a part of their time would be given to studies outside their regular duties. This arrangement continued several years and afforded quite a number of students opportunities to continue studies in special lines and in some cases to enter the permanent service of the Government. After a time, however, difficulties in the administration of such an arrangement, which involved a somewhat limited competition under Civil Service regulations, led the commission to withdraw its consent to its continuance.

Professor Armsby in his address as president of the college association in 1899 dwelt on the importance of the experiment stations considered as institutions for higher education in agriculture, and the role of station assistants as university students, who while engaged in research were actually getting much training in various phases of agricultural science.

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Part V.

Large Development of Agricultural Colleges 1900-1914.

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PART V

Large Development of Agricultural Colleges 1900-1914

General Conditions Favoring Growth of Agricultural Colleges

By the opening of the 20th century a period of unexampled general prosperity of American agriculture had set in. Economic conditions favored the multiplication and enlargement of industries and the expansion and diversification of agriculture. Settlement in new agricultural regions in the West increased and the rising prices of products and land in the country generally encouraged young men to work on farms and acquire land for the establishment of homes in the country. Special difficulties which hampered production in various regions called attention to the desirability of more scientific farming and the need of a knowledge of the means of controlling plant and animal diseases and insect pests as such means were being developed by the United States Department of Agriculture and the experiment stations.

While the relative number of people engaged in agriculture as compared with other industries decreased, the total number of farmers increased and conditions, including the invention and wide use of much farm machinery, favored a great increase in the efficiency of American farmers as measured by the yield of products per man.

The experiment stations and the United States Department of Agriculture were reaching great numbers of the more intelligent farmers and were assembling a great body of tested knowledge for use in agricultural education. Not only were there very many official publications freely distributed but agricultural journals, manuals and text-books were rapidly increasing in numbers and width of distribution.

In the colleges agricultural faculties were growing larger and material equipment for their work was being strengthened. The general content of the agricultural courses had been fairly well defined comprehensively and specialization, especially in the branches connected with agricultural production, was proceeding. There was much discussion of the problems connected with curriculum making for both long and short courses. The number of agricultural students was increasing and their standing in the colleges and universities was much improved.

Development of College Organization

As the faculties and student body in the agricultural work of the land-grant colleges grew and the variety of duties of these colleges increased, the necessity for a more complex organization became apparent. The presidents of the universities and of the larger colleges ceased to function as teachers. The universities were usually divided into colleges, among which was a college of agriculture. The special officer at the head of this college was usually called a dean. The college had a faculty, in which the workers in agriculture and the sciences directly relating thereto were usually employed full time, but often divided their time between teaching and research. The teachers of other subjects were either wholly in the service of that college or were wholly or partially engaged in other colleges of the university. Thus, for example, general chemistry might be taught in the College of Arts and Sciences and agricultural chemistry in that college or in the college of agriculture. Each college was divided into a number of subject-matter departments. At first all agriculture was included in one department but gradually this was divided and subdivided into departments of agronomy, horticulture, soils, animal husbandry, poultry, dairying, rural engineering, rural economics, etc.

Each department was given a head or chairman, who had general supervision of its work and to a greater or less extent the choice and management of its personnel.

The agricultural and mechanical colleges had an organization which approximated that of the university in so far as the size of the college and the variety of its duties necessitated a more or less elaborate organization.

When the agricultural experiment stations were organized under the Hatch Act of 1887 they became distinct departments of the college or university as the Federal law required. The title of director had come into use to designate the head of an experiment station organized as a separate institution. That title was carried over to the college stations. For fear of weakening the authority of the chief officer of the college or for what was supposed to be proper economy in the use of funds the president

of the institution or the dean of the agricultural college was at first often designated also director of the station. His position was often made more attractive by increase of his salary on account of the new duties involved in the management of the station.

While this arrangement seemed justified at first on account of the conditions prevailing at many of the land-grant colleges it often did not work well as a permanent organization. The president sometimes had little knowledge of agricultural science or practice and even the deans were greatly hindered in giving the stations efficient management by the increase of duties relating to teaching and the discipline of students or by reason of their lack of real interest in agricultural research. The Hatch Act brought to the agricultural colleges what for the time was an unusually large fund for research and when to this were added considerable amounts of State funds, which often imposed regulatory, as well as experimental, duties on the station its management really required the full time of a specially trained and capable director. The college presidents gradually withdrew from the station directorship but the custom of giving this designation to the dean persisted and has not yet been altogether abrogated. Various arrangements have been made in efforts to strengthen the station administration through the appointment of vice-directors or other administrative assistants or by giving the heads of the subject-matter departments broader administrative functions.

In some cases the station was made a more or less separate organization attached to the college, with a director who reported to the president or even to the trustees and had a staff with a considerable number of members wholly under his control and others detailed to the station for part of their time from the college departments. This was not a very satisfactory arrangement since the station and the teaching division of the college needed to have close and well-correlated relations.

The idea that the station should be a separate organization was to a certain extent fostered by the association which had as its name The Association of American Agricultural Colleges and Experiment Stations. This association was formed in the year when the Hatch Act was passed and was intended to include State stations separate from the colleges. Its first constitution gave "each experiment station established under State or Congressional authority" one voting delegate.

As amended in 1889 the constitution provided that "the same delegate may represent both a college and an experiment station, and may take part in the proceedings of the sections proper to either or both, but no delegate shall cast more than one vote either in a section or in convention."

An amendment in 1903 divided the association into two sections: "(a) a section on college work and administration, (b) a section on experiment station work." "The same delegate may represent both a college and a station, but shall vote in only one section and shall cast only one vote in general sessions." In the early constitutions, amendments might be adopted by "the vote of two-thirds of the delegates present" but in the constitution of 1903" the final vote on the adoption or rejection (of an amendment) shall be taken by yeas and nays of the institutions then and there represented." A final decision on the meaning of this paragraph was not made by the association until 1914 when the Director of the Office of Experiment Stations, as president of the association that year, ruled that since a station organized under the Hatch Act and connected with a college was a department of the college it was not entitled to a vote under this provision of the constitution. This decision was over-ruled by the association. By this time extension divisions had been formed in a considerable number of colleges and were sending delegates to the meetings of the association who desired to have voting privileges though it was clear that they did not represent separate institutions. The engineering and home economics departments of the land-grant colleges also wanted more definite recognition in the association. The problems of organization thus raised by the growing complexity in the organization of these institutions was

finally settled in 1919 by changing the constitution so as to create an Association of Land-Grant Colleges. This association continues, however, to include in its membership the agricultural experiment stations not connected with the colleges but receiving the benefits of the Hatch Act. The privilege of voting on questions relating to the organization, management and policy of the association is vested in an executive body composed of the presidents or executive officers of these institutions, known as "the legislative branch of the association."

Sections on agriculture, engineering and home economics are now organized in the association. The section on agriculture has subsections of resident teaching, experiment station work and extension work.

"The membership of the sections shall consist respectively of the directors, deans, or other administrative heads of these respective departments or divisions of the institutions having membership in the Association and of similar divisions of the United States Department of Agriculture and the Federal Bureau of Education." (635)

The growth of the extension work of the colleges brought about the employment of technically trained persons and clerks who gave their whole time to this work, and there were also many college and station officers and other employees engaged in this work part of the time. This development created new administrative problems in the colleges. At first the extension workers were attached to the different subject-matter departments and did their work under the supervision of the heads of these departments. But it was afterwards necessary to locate authority for their schedules of travel, attendance at meetings and other extension business in some central organization within the colleges to avoid administrative confusion and friction. Faculty committees on extension work were sometimes appointed but these did not prove very satisfactory. Then extension departments or divisions were created. Whereupon an administrative problem arose, similar to the one previously created by the establishment of the experiment stations. The extension department was in some cases made a quite distinct division of the college with a separate force; in other cases it was composed of members of the subject-matter departments, forming a somewhat loose organization under the supervision of

the dean or station director.

When it became evident that a Federal law would be enacted under which large grants of money from different sources would be given to the colleges for the maintenance of a broad system of extension work, thus making such work a large and permanent function of the land-grant colleges, discussion regarding the organization of this work became very active in the several colleges and in their association. There was great variety of opinion and practice but the discussion more and more definitely went on around the proposition that the whole agricultural work of a land-grant institution should be administered by a dean, under whom there should be directors of research, resident teaching and extension work respectively.

This plan was definitely stated in a paper by the Director of the Office of Experiment Stations at a conference on extension teaching in agriculture at the Southern Commercial Congress in 1912. The following extracts are from a summary of that paper in Experiment Station Record, volume 26, p. 703:

"The state colleges in which agriculture is taught are institutions broadly organized to give instruction in many subjects, and in twenty States the agricultural college is a part of the state university. It is now generally agreed that the agricultural work of the institution should be organized as a distinct unit, to which the name College of Agriculture is commonly given. Within this college are three main lines - research, interior teaching, and extension work. It is well, therefore, that three administrative divisions should be made within the college to which the names Agricultural Experiment Station, Division of Instruction, and Extension Division may be respectively given. But it is also appropriate, and indeed essential, that the college as a whole should be divided according to the subject matter included within its curriculum into departments such as those of agronomy, animal husbandry, dairying, etc.

Since it is highly important that the information on any subject given to the students and public should represent the views of the institution as a whole, all the experimenters, teachers, and extension workers should be grouped by departments representing the specialties in which they are working. Thus the department of agronomy should embrace all the agronomists employed by the college, whether they are engaged in experimenting, teaching or extension work. Each department will naturally be presided over by a chief, who will have authority to assemble all the workers in this line for consultation regarding the subject matter of their work, methods of instruction, etc. All the workers will be expected to keep in close touch with their respective departments, so as to be fully acquainted with their work and the progress of knowledge in these lines.

On the other hand, each member of a department will also be a member of a division, or in some cases of two or three divisions, and be expected to report to one or more division directors who will have authority to control the whole or parts of his time and assign him to duties as experimenter, teacher, or extension worker.

This dual responsibility is already recognized in many institutions as regards the experiment station and the teaching, and needs only to be extended to cover the extension work. As far as possible it is very desirable that the individual shall devote himself primarily and chiefly to one line of work, and as the extension work increases, it will be necessary more and more to have men working exclusively in that department. This is already true with regard to the experimentation.

To carry out such an organization several classes of administrative officers will be required. The general management of the university or state college as a whole will naturally be vested in a president. Under him will be a number of deans, one of whom will have charge of the college of agriculture. Under this dean will be three directors - (1) of the experiment station, (2) teaching division, and (3) extension division. Each of these directors will have administrative control of his division. Where the work and staffs of the division overlap or cooperative action is desirable, the three directors should form a general administrative committee under the chairmanship of the dean. The control of the directors over the individual worker will chiefly have to do with the division of his time and his assignment to duties within the respective divisions.

The general program for the work of the college should be made up through the faculty, consisting of the dean, directors, heads of departments and other professors whose rank entitles them to be members of the faculty under the general policy of the institution. One feature of this program should be conferences of the workers in each department, under the chairmanship of the head of that department."

The same plan was briefly presented at the meeting of the agricultural college association in 1913. In a general way this plan was approved in 1917 by the Committee on College Organization and Policy of the association after an extended study made in cooperation with the Bureau of Education through Dr. C. D. Jarvis. The results of this study were incorporated in the following recommendations:

"1. That the individual specialist, capable of working independently, should be regarded as the unit of organization.

2. That the group of working specialists on any one of the recognized subjects, regardless of the kind of service, should constitute the subject-matter department.

3. That specialists should devote their time mainly to one kind of service, but provision should be made for exchanges for the mutual advantage of each.

4. That one member of each department should be designated as chairman or administrative head.

5. That the members of the subject-matter department should be given a voice in the designation of their chairman or administrative head.

6. That authority for subject-matter should be confined to the group of specialists comprising the subject-matter department, and that administrative control should be limited to the amount and method of work.

7. That the distribution of administrative authority should be on the basis of the kind of service.

8. That the three kinds of service, each in charge of a secondary administrative officer, should be coordinated under a chief executive who, in the case of a large institution composed of several faculty groups, should be an officer other than the president.

9. That the official designation 'dean' in an agricultural college should be applied only to the chief executive officer who is responsible for the coordination of the three phases of agricultural service, and that of 'director' should be applied to the coordinate officer in charge of each of the three lines of service - resident instruction, research and extension.

10. That when one individual performs the duties of two or more offices his official designation should identify clearly the officer with the respective offices assigned.

11. That the leaders in charge of the various phases of the extension service should be regarded as administrative officers and should not usurp the duties of the specialists in the various subjects. Where an individual serves both as specialist and administrative leader a dual responsibility should be recognized.

12. That in the promotion of extension projects controlled by either connected or cooperative colleges the same administrative relations with the subject-matter departments concerned should exist as with departments that are organically connected.

13. That incoming correspondence, except that of an administrative nature, should be referred to the subject-matter departments concerned and there referred to the individual best qualified to supply the desired information.

14. That specialists in whatever kind of service should be on an equal basis from the standpoint of rank and official designation. If differentiation of extension and research specialists is desirable, the prefixes 'extension' and 'research' respectively may be used in connection with the customary professional titles." (635)

The complicated organization and varied local conditions in the several land-grant colleges have so far prevented the general acceptance of this plan of organization. It is, however, followed substantially in a number of the larger institutions and approximately in others.

This movement has been helped by the determination of the Department of Agriculture, which was announced in 1914, to differentiate its research, extension and regulatory work more definitely and modify its organization to meet the new conditions caused by the expansion of its activities. This has resulted in the appointment of directors of scientific, extension and regulatory work, who have general charge of these lines of work respectively under the Secretary of Agriculture, but without breaking the bureau organization within the department.

College Buildings for Agriculture

One of the important factors in strengthening the agricultural work in the land-grant colleges during the decade beginning about 1900 was the erection at many institutions of distinctive and substantial buildings for use in that work.

These were either large buildings to house most of the agricultural work in progress when they were erected or smaller buildings for different branches of the work such as horticulture or dairying. To the students and in considerable measure to the general public such buildings on the college campus typified the dignity and importance of the agricultural work of the institution. This was particularly true where the college of agriculture was part of a university.

The first large agricultural building of the new type was Townshend Hall, at the Ohio State University. This was erected in 1898 at a cost of about \$77,000 and was named for Dr. N. S. Townshend "as a memorial of his public services and his work in advancing the cause of agricultural education." It was 260 feet in length and varied in width from 64 to 78 feet. It had a basement and two main floors. In its original use the basement contained the dairy department, with rooms for testing and pasteurizing milk and for butter and cheese making.

At the opposite end of the basement were a lecture and livestock judging room with adjacent stalls for animals, and a storage room for soils, near to an outside glass-house for the experimental study of soils and crops. The first story contained the offices, class-rooms, laboratories, reading room, library and museum of the department of agriculture. At one end was a large soil physics laboratory with special apparatus of a new type. The second floor contained the departments of agricultural chemistry and veterinary medicine, an assembly room and an office for the editors of the Agricultural Student.

The building for the College of Agriculture of the University of Illinois, opened in 1901, consisted of a main portion 248 ft. in length from 50 to 100 feet in depth and three stories in height, with 3 wings, each 45 by 117 feet and 2 stories in height, connected with each other and with the main portion by corridors, all built around an open court. The entire floor space was a little over 2 acres. This building contained an assembly hall, offices, class rooms, laboratories, seminar rooms, etc. for departments of agronomy, horticulture, animal and dairy husbandry, veterinary science, farm mechanics, dairy manufactures, economic entomology, soil physics and biology, experiment station laboratories, photographic rooms, horticultural museum, exhibit room and laboratories for farm machinery, stock-judging room, milk bottling and cheese rooms, refrigerating plant, etc. A floor of one wing was occupied by the department of household science. This building was dedicated with formal ceremonies May 21, 1901. Addresses were made by Professors Hunt, Burrill and Davenport, Hon. Joseph G. Cannon, and representatives of various farm organizations of the State. There was a large attendance of leading farmers and others from different parts of Illinois.

At the College of Agriculture of the University of Minnesota, located on a farm between the cities of Minneapolis and St. Paul, there were erected buildings for horticulture, animal husbandry, dairying, veterinary science, agricultural chemistry and finally a great administration building, completed in 1907 at a cost of \$250,000, which included among other thingsm class-rooms and laboratories for the work in agronomy, farm accounts and entomology, and an auditorium seating 1,000 people.

Before 1900 the College of Agriculture of the University of Wisconsin had a substantial dairy building with a dairy laboratory and rooms devoted to creamery practice, cheese making and curing, pasteurizing, farm dairying, etc.; and in 1896 completed a unique horticulture-physics building to which were attached

large glass houses. The work in agricultural physics included meteorology, drainage, irrigation, road building, construction of farm buildings and soil physics. In 1901 the State legislature made an appropriation of \$150,000 for an agricultural building. This structure, completed in 1903, contained the administrative offices of the college and experiment station, the class-rooms and laboratories of the departments of agronomy, animal husbandry, bacteriology and chemistry, the offices of the superintendent of farmers' institutes, library and auditorium seating over 700. It had a frontage of 200 feet by 64 feet in depth, and a height of three stories and basement, with an octagon addition in the rear.

When the State of New York undertook to maintain the College of Agriculture at Cornell University the legislature in 1904 provided a building fund of \$290,000. A group of three buildings connected by covered loggias and a detached building for the department of animal husbandry were constructed and were dedicated April 27, 1907, in connection with the celebration of the centennial anniversary of the birth of Ezra Cornell. The main building, central in the group, contained offices of administration, extension, library, auditorium, and lecture rooms and laboratories for departments of horticulture, zoology, entomology, and home economics. The dairy building was built in two sections. One contained rooms for instruction and practice in dairy mechanics, laboratories for dairy bacteriology, milk-testing laboratory, reading room, museum, laundry, etc. The other was a manufacturing establishment, containing rooms for milk receiving, separators, cheese and butter making, farm-dairy practice, market-milk handling, refrigeration, storage, ect. The agronomy building contained rooms and laboratories for teaching and experimentation with soils, crops, plant physiology and pathology, and instruction and exhibition of farm machinery.

The group of agricultural buildings dedicated at the Pennsylvania State College, November 22, 1907, cost about \$300,000 and included an agricultural building for the departments of agronomy, horticulture, agricultural chemistry, animal husbandry, animal nutrition, and agricultural extension; a dairy building with rooms and equipment for work with milk, the making of butter, cheese and ice cream, farm dairying, bacteriology, etc.; and a respiration calorimeter building.

The Iowa State College erected in 1904 a dairy building, 110 by 60 feet, with three stories and basement, which provided rooms and equipment for work similar to that described for Pennsylvania. To this was added in 1909 a monumental agricultural building, 230 by 78 feet, with a semi-circular wing containing an assembly room seating 1,000 people. The building and its furniture cost about \$375,000. It contained accommodations for instruction and investigation in soils, farm crops, animal husbandry, horticulture, forestry, agricultural chemistry, agricultural journalism and extension work.

Before 1910 substantial agricultural buildings were also provided for the colleges in Kansas, Texas, Indiana, New Hampshire, Oregon, South Carolina, Vermont, Oklahoma, North Carolina, Georgia, Maine, Michigan, Montana, and California; dairy buildings in Mississippi, Missouri, Kansas, Nebraska; horticultural buildings in Massachusetts, Kansas; and the quarters for instruction and research in the various branches of agriculture and related sciences were much improved in other buildings used by the colleges in many States.

Special Buildings

Special buildings for use in instruction and research became quite numerous on the grounds of the agricultural colleges. One of such early structures was the insectary built at the New York Agricultural College in 1888. This was a two-story cottage with greenhouses attached, and contained a laboratory, workshop, dark room for photography, cold room for the storage of hibernating insects. It was provided with various pieces of apparatus devised at the station, among which were a root cage and various forms of breeding cages.

As the work in agronomy, horticulture, plant physiology and pathology, and entomology grew, glass-houses increased in variety and extent. Sometimes laboratories and workshops were connected with these houses and some of them were so arranged that classes of students could work in them. Pot experiments were also carried on in such houses, often with special arrangements for transferring the pots into the open air without disturbing them.

In connection with the work in animal husbandry barns of different kinds were erected. Sometimes these were large and expensive structures. In other cases they were built to illustrate barns such as prosperous farmers might have. With the specialization of the work separate barns for different kinds of animals were built. There was a special development of dairy barns in the effort to make them sanitary and provide good ventilation and convenient feeding arrangements.

During this period there was great activity in the use of silage and various kinds of silos, as regards form, size, material of construction, etc. were built at the colleges. Where large numbers of animals were fed and the climatic conditions permitted more or less elaborate feeding sheds and lots were used. Piggeries of various kinds were constructed, as well as poultry houses. The latter were often equipped with trap-nests and contained special rooms for work with incubators.

The great interest in stock judging developed during this period led to the construction first of special rooms for this work and then the erection of separate stock-judging pavilions. In 1901 the Iowa College built such a pavilion circular in form, 65 feet in diameter, with a seating capacity for 300 students and a judging pit 50 feet in diameter. The great popularity of stock-judging, especially as the colleges increased their participations in competitive tests at fairs and particularly at the International Livestock Show at Chicago, led to the erection of larger and more elaborate stock-judging pavilions at these institutions.

In 1909 the College of Agriculture in Wisconsin erected an animal husbandry pavilion at a cost of \$75,000, which is described in the Report of the Office of Experiment Stations for that year, as follows:

"The building fills a space of 207 by 114 feet, with a stock-judging tanbark arena, 164 by 66 feet, occupying the central space. Around this arena are seven concrete ledges upon which are grass-cloth mates providing comfortable seats for over 3,000 persons. The entire structure is of reinforced concrete with brick exterior and a green glazed tile roof.

In the basement, which extends along one side and the two ends of the building, are provisions for housing live stock, including 14 large box stalls, 22 hitching stalls, and a large foaling stall for brood mares. One end of the basement is separated from the rest by tight doors, so that it may be isolated in case of an outbreak of disease among the animals. In this part of the building is a large veterinary operating room with a dispensary on the floor above. This basement is well provided with windows, and the King system of ventilation assures fresh air throughout the structure.

The floors are all of concrete overlaid with wooden pallets except in the arena, which is covered with tanbark. There are two exits for animals and five exits for the audience. Skylights and windows in the gables of the auditorium provide light by day, and numerous arc lights provide illumination at night. The building is heated by steam, has forced ventilation, and is fully equipped with dressing rooms for the use of classes of students.

In the front wings of the building are offices for the farm superintendent and animal husbandman, living quarters for the attendant in charge of live stock, offices for the veterinarian and the department of horse breeding, and a large demonstration room for class purposes.

The storage facilities for feed are especially convenient, including seven large concrete feed bins to hold grains and mixed feeds, a root cellar which will hold several tons of roots, and hay bays which will shelter over 60 tons of hay and bedding.

501

The auditorium is to be provided with two large drop curtains which may be used to divide it into three class rooms for students' work in stock judging. This will provide much needed facilities for this purpose for the college during the sessions of the short course when the classes in stock judging frequently include hundreds of students. (564)

Grain judging also became an important factor in agronomy courses and special arrangements for this were made in the college buildings. In 1908 at the Nebraska College a substantial building devoted to stock and grain judging work was erected.

When a department of farm mechanics was established at the Iowa College a building for its special use was erected in 1903 at a cost, with its equipment, of over \$65,000. This included wood and iron-working shops, large operating testing rooms for the study of farm motors, binders, mowers, planters, plows, wagons, and other farm machines as well as rooms for classes, drafting, reading, offices, etc. Buildings for similar purposes were erected at other colleges and in Colorado in 1909 a building in which considerable space was devoted to the work in irrigation engineering.

Equipment for Instruction in Agriculture

In both agriculture and the related sciences the equipment of the agricultural colleges became more and more extensive and varied as the number of students and the funds for their instruction increased. The work of the experiment stations connected with these colleges called for the employment and devising of many unusual kinds of equipment. The college students, especially those in the advanced work, had at least the opportunity of observing this equipment and the methods and results of its operation. A considerable number of students were employed to some extent in the stations and thus came into intimate contact with their equipment. In the natural sciences the laboratory method of instruction became universal in the American colleges and many of the agricultural colleges had excellent equipment for work in these sciences.

For the study of soils there was the devising and use of much special apparatus. For example the equipment for soil study in Townshend Hall of the Ohio State University is thus described in Bulletin 127 of the Office of Experiment Stations in 1903:

"The soil physics laboratory is supplied with apparatus for studying the specific gravity of soils; volume weight of soils; power of loose soil to retain moisture; power of compact soil to retain moisture; rate of flow of air through soils; rate of percolation of water through soils; effect of mulches on evaporation of water from soils; effect of cultivation on evaporation of water from soils; power of dry soil to absorb moisture from the air; and the capillary rise of water through soils. Mechanical analyses are also made of typical soils.

In the study of soils, the large glass house with its equipment of railroad tracks, trucks, and pots affords opportunity for the student to test the adaptability of crops to various soils; the fertilizer requirements of soils and to experiment on various other problems of crop growth." (582)

At the same time in the agricultural building of the Illinois College there were separate laboratories for work in soil fertility, soil physics and soil bacteriology.

"Two laboratories are provided for the work in soil fertility. One of these is used for the analysis of soils, fertilizers, and manures; for the determination of the elements of plant food contained in plants and plant products, and for the preparation of soils for pot culture experiments, which include the use of sand cultures, water cultures, and soil cultures, with the addition or elimination of any or all of the different elements of plant food. The second is the pot-culture laboratory, which is located in the greenhouse near the agricultural building, and in which the pot-culture experiments are carried on by the student as a part of his regular laboratory practice. The soil fertility analytical laboratory is provided with desks for 18 students' places, each desk being made double, so that by working two sections 36 students can be accommodated. All apparatus necessary for the analysis of soils, fertilizers, etc., is provided, including analytical balances, digestion furnaces, distillation apparatus, glass and porcelain ware, etc. The laboratory is provided with a hood under which operations which give off poisonous or disagreeable fumes or odors are performed. The desks are piped for gas, compressed air, vacuum and water, and provided with sinks and waste pipes. The fertility pot-culture laboratory is provided with suitable tables and with several hundred glazed pots of different sizes suitable for pot-culture experiments."

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"The soil physics laboratory is provided with a sufficient number of desks to allow 24 students to work at one time, and, by running two sections, 48 students can be accommodated. This laboratory is well equipped with the apparatus necessary for studying the physics of soil, including centrifugal machines and shaking apparatus used in mechanical analyses, microscopes, balances, compacting apparatus, apparatus for determining the water content,

absorptive capacity, water-holding power, and specific gravity of soils; several electrical instruments for the determination of temperature, moisture, and soluble salt-content of soils; a 3-horsepower electric motor with a line shaft, counter shaft, belting, etc.; elutriators, furnaces, sieves, and much other general apparatus. The laboratory is also provided with a side table, hood, large drying oven, and store-room."

The soil bacteriology laboratory "is equipped with incubators, microscopes, autoclaves and other sterilizing apparatus, balances, and other materials needed for bacteriological work, including staining solutions, chemicals, media, etc. The hood tables and the tile-top side tables are provided with steam baths, gas, air, vacuum, and water pipes, and waste sinks. Adjoining the laboratory are a store room, an incubating room, and an animal room with cages for keeping animals under experiment."

For the study of farm crops the Minnesota Agricultural College had "a seed-breeding laboratory which furnishes facilities for special instruction in field seeds and in laboratory work in plant breeding. The college possesses a stereopticon with several hundred lantern slides, including illustrations of crops, implements, machinery, processes of drainage, etc.; imported models of wheat and of clover flowers and seeds; many charts of root systems and illustrations of floral organs which have been drawn at this institution; also maps and designs of farm plans, both for laying out new farms and for reorganizing old ones. Several hundred pasteboard boxes 24 inches long, 13 inches wide and 5 inches high, such as tailors use for suit boxes, are annually filled with bundles of weeds, grasses, and forage crops. These serve in the classes for material to tear apart, examine the seeds, and get acquainted with the general appearance. Seeds are also preserved in bottles." (582)

There were also in many colleges collections of many different kinds of grasses, cereals and other crops and of seeds of useful and noxious plants, as well as a great variety of farm implements and machinery.

Domestic animals of different kinds were increasingly kept by the colleges for instructional purposes and the students also had many opportunities for observing breeding and feeding experiments, and participating in the judging, care and management of such animals. With dairy cattle different kinds of stalls and their fixtures and later milking machines were often used. For the handling of milk and the making of butter and cheese many of the colleges began to have equipment which compared favorably with that in commercial establishments. The libraries of the agricultural colleges also made material growth during this period. Not only were there large collections of the publications of the Department of Agriculture, Bureau of Education and other Government establishments and of the experiment stations and State departments of agriculture and

education, and reports of similar institutions in foreign countries, but also numerous scientific and agricultural books and journals published in this and other countries. More attention was also paid to the arrangement and cataloguing of these collections and the facilities and personal service which would make them readily available to teachers and students.

Much was done during this period in the preparation and publication of text-books and manuals on agriculture and related sciences. The Annual Report of the Office of Experiment Stations for 1903 contained an article on the development of the text-book of agriculture in North America up to 1900, by L. H. Bailey. This was followed by the report of the bibliographer of the association of agricultural colleges at its meeting in November, 1906, which contained a list of 389 books, the work of 198 men and women at some time connected with agricultural colleges and experiment stations. In this list was included Bailey's Cyclopedia of American Horticulture, published in 1906, which was soon followed by his Cyclopedia of American Agriculture.

College Farms

As the agricultural work of the college became more extensive and diversified the amount of land used in connection with instruction increased. Part of this land was used for the growing of crops with which to feed the college livestock and in some cases the students. Fields were also set aside for the growing of crops that were being tested with reference to their adaptability to the region of the college, or for the demonstration of different methods of planting, fertilizing, cultivating, draining, irrigating, and harvesting. Orchards of different kinds and varieties of fruits, and plantations of small fruits, vegetables and flowers occupied considerable space. At some colleges there were small plantations of forest trees. There were also the more or less extensive fields, orchards and series of plats used by the experiment stations on which numerous varieties of many kinds of plants were

grown under a great variety of conditions. At some institutions there were botanic gardens in which were grown many native and foreign plants, particularly those of some economic importance.

At some colleges the farms were under a single general management with temporary assignments of portions of the farm to the experiment station and different college departments. In other cases the experiment station land was permanently separate and in a few institutions there were permanent assignments of land to the different departments which assumed their management for special purposes. While the old compulsory manual labor system for students disappeared, there was a considerable amount of required labor on a field laboratory plan. A certain number of students were employed and paid for part-time work on the college and station lands. The students generally observed the station experiments and thus became familiar with whatever useful progress in new directions the stations were making. The use of large tracts of land in connection with agricultural instruction and experimentation marked a somewhat radical departure from the conception that higher agricultural education should be very largely a matter of lectures and laboratory work as was held by some of the early leaders in this movement, e. g., by Prof. S. W. Johnson and Prof. E. W. Hilgard.

The extent of the land used in 1910 by agricultural colleges, largely as farms and experiment grounds, is shown by the following examples: Illinois 620 acres, Iowa 1,200, Kansas 800, Massachusetts 400, Minnesota 420, Mississippi 2,000, New York 638, Oregon 180, Pennsylvania 600, and South Carolina 1,544.

Increased Federal Funds for Agricultural Research

The growth of public interest in the agricultural colleges, the enlarged faculties and student bodies, and the provision of more elaborate buildings and equipment brought upon the experiment stations additional burdens which they could not bear satisfactorily without more well-trained workers and larger financial support. Attention was called to the needs of the stations in the report of the Director of the Office of Experiment Stations for 1902.

"So rapidly has the demand for the services of agricultural experts spread in different directions that the workers in this service have in many instances been overworked, or at least have been forced to dissipate their energies in attempts to cover too many fields. There is therefore a most urgent necessity that the number of workers in our agricultural institutions should be increased so as to permit proper specialization of work. . . . It is of little use to construct expensive laboratories and equip them with elaborate apparatus unless they are manned with first class investigators."

An editorial by Dr. E. W. Allen, published about this time in the Experiment Station Record, was cited, which pointed out that "the

character of the work of the stations is gradually undergoing a change. The simpler and more superficial problems in many lines of agriculture have been solved to a large extent and demonstrated beyond doubt. The more complex and intricate investigations involving deeper and more time-consuming research will be the field more largely occupied by the leading stations in the future."

At the meeting of the Association of American Agricultural Colleges and Experiment Stations at Atlanta, Ga., October 7, 1902, a resolution offered by Dean Eugene Davenport of Illinois was adopted, which instructed the Executive Committee, "if in its judgment it should seem expedient, to urge upon Congress at the earliest practicable date that the appropriation to the several states under the Hatch Act be increased by the sum of \$15,000 annually." (635)

The increased importance of the experiment stations was also brought out at this meeting through an amendment to the constitution of the Association offered by Dean W. A. Henry of Wisconsin and adopted the next year, which provided for a section on Experiment Station Work.

Adams Act

The Executive Committee decided that it would be unwise to attempt legislation for increased federal endowment of the experiment stations in the 57th Congress but laid the foundation for future action in this direction by asking the Director of the Office of Experiment Stations to present in his next annual report a statement of the present conditions and work of the experiment stations and of the need of additional funds for their work. Such a report was made in 1903. Nothing further was done in this matter at the Washington meeting of the association that year but immediately thereafter Dean Henry called on his long-time friend, Henry Cullen Adams, former Dairy and Food Commissioner in Wisconsin, and then a new member of the National House of Representatives. Mr. Adams readily agreed to undertake to secure the passage of a bill giving additional federal aid to the experiment stations. With the aid of the Director of the Office of Experiment Stations a bill for this purpose was drawn and introduced in the House by Mr. Adams on January 4, 1904. Stress was laid by Dean Henry and Dr. True on the need of funds especially for the higher forms of station work. The Adams bill was therefore so worded as to restrict the use of this new fund to paying the expenses of original research in agriculture.

The executive committee of the association cooperated actively with Mr. Adams and his measure had widespread support from the agricultural press and farm organizations. It also early received favorable consideration from a large number of Congressmen. But the leaders in Congress had set themselves firmly against increase of federal appropriations. Therefore this bill made no progress during the 58th Congress. It was reintroduced in somewhat modified form by Mr. Adams early in the first session of the 59th Congress and on January 15, 1906, he was able to make a favorable report on this bill from the House Committee on Agriculture. It then made relatively rapid progress through both houses, was passed without dissenting votes and was approved by President Roosevelt March 16, 1906. (669)

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

RESEARCH REPORT NO. 100

1950

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Mr. Adams, by great tact and patience, had achieved a notable legislative victory through the final passage of this important measure. He had long worked under a serious handicap of poor health and on July 9, 1906 he passed away to the very great regret of all who understood his profound interest in agriculture and the farming people.

The Adams Act appropriated \$5,000 for the year ending June 30, 1906, an annual increase of this sum by \$2,000 for five years, and thereafter \$15,000 annually to the agricultural experiments organized under the Hatch Act in each State and Territory, "to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States." The Secretary of Agriculture was "charged with the proper administration of this law."

The details of this administration have been carried out by the Office of Experiment Stations. The stations were persuaded by the director of this office to annually submit their plans for work under this act to the office in advance of payment of the Adams fund. These plans have taken the form of limited and specific projects and have only been approved when it has appeared that they involved original research. The Adams Act has therefore given the stations a substantial financial basis for their higher work and in general has greatly strengthened them.

Promotion of Graduate Study

Some leaders in the colleges perceived that something more than an ordinary undergraduate course with a bachelor's degree was required for the preparation of college teachers, investigators and experts in various agricultural lines. Some graduate work was being offered in certain institutions but as yet it was not well organized.

The Summer Graduate School

While Thomas F. Hunt, dean of the College of Agriculture and Domestic Science of Ohio State University, was attending the convention of the Association of American Agricultural Colleges at San Francisco, Cal., in July, 1899, it occurred to him that it would be a good plan to organize a graduate school of agriculture.

"After informal consultation with a number of the officers of the agricultural colleges and experiment stations at this convention and elsewhere, Professor Hunt brought this matter to the attention of Dr. W. O. Thompson, president of the university, who agreed with Professor Hunt that such a school was desirable. They also agreed that an effort should be made to have the Ohio State University inaugurate a movement for the establishment of this school, and if feasible to take charge of its first session. They therefore brought this matter to the attention of the board of trustees of the university, and on their recommendation the board took action in April, 1900, in favor of the establishment of such a school, and generously made provision for its financial support.

At the convention of this Association in November, 1900, President Thompson presented in general terms the plan for the school and asked the Association to express its opinion regarding this enterprise at its next convention." (665)

President Thompson made it clear that it was the purpose of the Ohio State University to inaugurate a movement in which the colleges represented in the association would be expected to cooperate. "The proposition would be to have a faculty of instruction gathered from the colleges and experiment stations represented in this convention." It was to be "an intercollegiate school of agriculture" and to have "a migratory character" if experience showed that it was best "to take it from institution to institution."

The association referred this matter to its executive committee which at the convention in November 1901 reported its approval of the plan suggested by the Ohio State University and recommended the holding of the first session of the school during the summer of 1902 "under the control of the president of the said university, with the expectation of adopting the school as a cooperative enterprise under the control of the convention should the success of the first session seem to justify the continuance of the school."

In 1900 the board of trustees of Ohio State University had made an appropriation of \$1,000 to finance such a school and the next year the authorities of the university having learned in advance of the decision of the Executive Committee of the College Association had "felt justified in taking some preliminary steps toward the organization of the school." The Secretary of Agriculture expressed his approval of this project and his willingness to have the Director of the Office of Experiment Stations act as its dean and other officers of the department to be members of the faculty.

Many of the officers of the colleges and stations expressed their interest in the school in response to a circular letter from the University. With this and other information before them the association approved the report of its executive committee. The university then took prompt action to hold the first session during July 1902. A. C. True was made dean and Prof. Thomas F. Hunt acted as registrar. The school was opened July 7, 1902 and continued for four weeks. At the inaugural exercises addresses were made by Hon. James Wilson, Secretary of Agriculture, President H. C. White of the Georgia College of Agriculture, as Chairman of the Association of Agricultural Colleges, and the dean.

"Courses were offered in three main lines - agronomy, zootechny, and dairying. A special course in plant and animal breeding was also planned and arrangements made for general exercises in agricultural pedagogy and on special topics to be held in the Saturday morning periods.

The university authorities put at the disposal of the school the large and well-appointed building devoted exclusively to the instruction given in the college of agriculture of the university, known as Townshend Hall. This building contains well-appointed lecture rooms, thoroughly equipped laboratories, and an agricultural library. Animals of different kinds and breeds were obtained from leading breeders in Ohio for use in demonstration exercises. A matriculation fee of \$6 for each student for the whole session or any part thereof was asked, this being the fee regularly charged by the Ohio State University for each term. Arrangements for board and lodging were made in the neighborhood of the university for from \$5 to \$7 per week, and the north dormitory of the university was open to the school, where board and lodging were provided at \$5 per week and for table board at \$4 per week."

111

"The faculty included 35 men, of whom 26 are professors in agricultural colleges, 7 are leading officers of the Department of Agriculture, and 2 are officers of the New York State Experiment Station. Seventy-five students were in attendance. These were drawn from 28 States and Territories, including such widely separated regions as Maine, Oregon, California, New Mexico, and Alabama. There was 1 student from Canada and 1 from Argentina. There was also 1 woman, and the colored race was represented by teachers from the Tuskegee Institute and the North Carolina Agricultural College. Twenty-seven of the students are professors or assistant professors of agriculture in agricultural colleges, 31 are assistants in the agricultural colleges and experiment stations, 9 are recent college graduates, and 8 are engaged in farming."

"The lectures and other exercises given at the school were as a rule of a high order. Much new information was presented, as well as useful reviews and summaries, with special reference to the needs of different students. There was a large amount of interesting and profitable discussion among students and the faculty both inside and outside the lecture rooms. The course of study was pursued with great earnestness by both faculty and students and it was even necessary to restrain the faculty and students from too prolonged exercises. The Saturday morning conferences proved to be of great interest. Among the topics treated in these exercises were the organization of agricultural education in colleges, secondary schools, nature-study courses, correspondence courses, farmers' institutes, and various forms of university extension, what constitutes a science of agriculture, the educational values of courses in agriculture, and methods and values of cooperative experiments." (665)

The broad aim of this school, which in considerable measure, was justified by its results as it continued to operate, was thus stated by its dean at the session in 1902:

"In an unusual measure we believe this school will furnish inspiration and up-to-date knowledge to workers in our agricultural institutions, gathered out of many States and Territories; but beyond this, we believe that in its ultimate results this school will greatly aid in the formation of public opinion in favor of the more thorough and rational organization of agricultural education and research in the United States.

The school will aim to solidify and amplify the organization of education and research in agricultural subjects on the basis of agriculture itself, considered as both a science and an art. It will seek on the one hand to help on the movement for grouping the results of investigation in many scientific lines into a fairly well-defined body of knowledge, to be known as the science of agriculture, comparable with such sciences as geology, geography, and medicine, and on the other hand to quicken and broaden the movement for the direct application of science in manifold ways to the art of agriculture. While we expect to pursue our work with high standards of scientific and pedagogical effort, we will not for a moment lose sight of the farmer and the requirements of practical agriculture. All our labor will be counted as in vain if it does not issue sooner or later in the growing of plants and animals better adapted to the uses of men and the evolution of a system of farming in which the financial returns shall be more satisfactory to the intelligent and thrifty farmers, and under which the general level of intelligence, comfort, and upright and harmonious living of our rural population shall be perceptibly and increasingly raised." (564)

The fundamental basis of the development of courses of instruction in agriculture was also presented with some elaboration by the dean in papers on "The science of agriculture" and "Educational values of courses of agriculture." Both these papers were published in the report of the Office of Experiment Stations for 1902 and the latter in Bulletin 19 of Ohio State University. The science of agriculture was compared with geology, geography, and medicine, as a science which is made up of materials derived from other more fundamental sciences such as chemistry, physics, botany, zoology, etc. It may be defined as

"that body of knowledge (gained and verified by exact observation and correct thinking, methodically formulated and arranged in a rational system) in which the facts relating to the production of plants and animals are accurately set forth, and a rational explanation is given of the phenomena and laws involved in such production and uses. It is obvious that this body of knowledge may be variously subdivided, according to different purposes of study or application." (564)

Agriculture may be divided into Plant Production, Animal Production or Zootechny, Agricultural Technology or Agrotechny, Rural Engineering and Rural Economics.

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"Under Plant Production is included whatever related to the natural or artificial environment (i. e., climate, soil, water, fertilizers) of useful plants, their structure, composition, physiology, botanical relations, varieties, geographical distribution, culture, harvesting, preservation, and uses, and the obstructions to their growth, preservation, or use. Plant Production may be subdivided into Agronomy, which deals with what are commonly called field or farm crops; Horticulture, which deals with vegetables, fruits, and ornamental plants, especially as grown in gardens, small plantations, or parks; and Forestry, which deals with trees and shrubs grown in large tracts."

Animal Production includes "whatever relates to the anatomy, physiology, zoological relations, domestication, types and breeds, breeding, feeding, Hygiene, management, and uses of useful animals. It may also include * * * diseases and other impediments to the production of animals, i. e., Veterinary medicine, though this is in itself a large and distinct body of knowledge." (564)

Animal Production may be subdivided according to the different kinds of animals or into such branches as animal breeding, animal nutrition and animal management.

1943

"Agrotechny includes whatever related to the conversion of raw materials produced in agriculture into manufactured articles for use in commerce and the arts. It may also include the processes of handling these raw materials in connection with their commercial uses, as in the case of milk and cream sold for consumption. It also involves whatever relates to departures from standards set for manufactured articles, i. e., adulterations and sophistications, in somewhat the same way that the diseases of plants and animals are related to Agronomy and Zootechny. Agrotechny is naturally divided into specialties according to the kinds of materials, e. g., foods and feeding stuffs, liquors, oils, textiles, and leather. The subdivision of most importance as a subject of school instruction in the United States is dairying."

"Rural Engineering includes those branches of civil and mechanical engineering which relates to the locating, arranging, and equipment of farms and the construction and operation of farm implements and machinery. It embraces the surveying of farms, the location of farm buildings and works, the construction of buildings, water, irrigation, drainage, and sewage system, and roads. It also involves the principles of mechanics as applied to farm machinery and the use of different kinds of power for agricultural purposes."

"Rural Economics may be more or less broadly defined according to the point of view. It at least includes whatever is related to agriculture considered as a means for the production, preservation, and distribution of wealth by the use of land for the growing of plants and animals. It may include the development of agriculture as a business (history of agriculture), as well as the facts and principles of farm management under present conditions." (564)

The practical advantages of organizing agricultural instruction on a science of agriculture rather than the relations of the fundamental sciences to agriculture were pointed out.

"The differentiation of the body of knowledge, which may fairly be called the science of agriculture, from the other sciences will lead to profound changes in the methods of teaching agricultural subjects, the equipment for such instruction, and the arrangement of courses to meet the needs of different classes of students. We are, in fact, already in the midst of such changes. The most obvious result of this movement thus far is the division of the subject of agriculture among several instructors in a college, so as to make at least the beginnings of a real agricultural faculty. Thus we now have quite commonly in our agricultural colleges professors of agronomy, animal husbandry (zootechny), dairying, horticulture, and veterinary science. When a group of instructors is thus formed the natural consequence is a special building in which they may work, to a certain extent at least, in cooperation. When the building is provided it is seen to be appropriate and desirable that it should contain special arrangements, facilities, apparatus, etc., suited to the requirements of the subjects to be taught in it. This leads the instructors in several branches of agriculture to set their wits to work to devise special arrangements and apparatus which will improve the quality and thoroughness of their instruction. Along with this there is more study of the relation of the different topics to each other in a scheme of instruction, the rearrangement of courses, the improvement of methods of teaching, and the discussion of the whole subject of the pedagogy of agricultural science."

"According to President Eliot, of Harvard University, the essential constituents of education in the highest sense are as follows: 'We must learn to see straight and clear; to compare and infer; to make an accurate record; to remember; to express our thoughts with precision, and to hold fast on lofty ideals.' 'There is also', he says, 'general recognition of the principle that effective power in action is the true end of education rather than the storing up of information or the cultivation of faculties which are mainly receptive, discriminating, or critical.'"

"School courses, especially in high school and college, should therefore particularly promote the development of each pupil's dominant interests and powers, and further should seek to render these interests and powers subservient to life's serious purposes, which include self-support or some worthy form of service, and intelligent, active participation in human affairs." (564)

A properly constituted agricultural course, taken as a whole, will include both cultural and vocational studies. The educational value of two-thirds of the course would not be disputed. As regards the strictly agricultural portion of the course, much of it consists of materials drawn from physics, chemistry, various biological sciences, engineering and economics. "The objects, facts and phenomena brought before the student of agricultural science are of such a kind as to test his capacity to "see straight and clear" in a very high degree. There is also abundant opportunity "to compare and infer" and make "an accurate record" of what is learned, as well as to exercise the memory and to express thoughts with precision.

"It also may be fairly claimed that the study of agriculture in its human relations may have an ethical side of much educational value. We should teach men in our agricultural colleges to be intelligent farmers, not simply that they may thus make a better living, but also that they may be leaders in making agriculture a live, progressive art, which in the future shall provide a more stable and satisfactory basis for thrifty, intelligent, and refined rural communities, as well as a stronger guaranty for the manufactures, commerce, art, literature, and science of a higher civilization, in which industrial and civil peace, and not war, shall be the established order." (564)

In 1903 the Executive Committee reported to the association that no college had yet offered to take care of the graduate school but favored the appointment of a committee on graduate work to continue efforts in this direction. That committee reported in 1904 in favor of the continuance of the school, to be held every two years, under the auspices of the association at different colleges of agriculture in rotation. For its support they recommended that each college be requested to contribute a small sum - say \$25 - to aid in the maintenance of the school.

On that plan the University of Illinois undertook to have this school on its campus in 1906. At this second session the faculty consisted of 35 of our leading agricultural teachers and investigators, including five officers of the United States Department of Agriculture, twelve members of the faculty of the College of Agriculture of the University of Illinois and 18 professors and experts from 16 other agricultural colleges and experiment stations. The total enrollment of the school was 131, of whom 91 were classed as students. These came from 34 States and Territories, Hungary and India. Courses were given in agronomy, horticulture, plant physiology and pathology, zootechny, and plant and animal breeding, with special reference to the production of plants and animals suited to the conditions in the Mississippi Valley and the Great Plains. General problems relating to the organization of agricultural education and research were discussed at conferences and informal meetings. A meeting of dairy instructors and investigators resulted in the formation of the National Association of Dairy Instructors and Investigators.

In 1908 the third session was held at the New York College of Agriculture at Cornell University, in cooperation with the New York Agricultural Experiment Station. Courses were given in biochemistry, agronomy, horticulture, entomology, dairy husbandry and dairying, poultry, and veterinary medicine. In connection with the lectures and seminars special attention was given to methods of investigating agricultural problems and teaching agricultural subjects. There

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were also a number of conferences on general topics relating to agricultural education. The faculty numbered 60, in addition to 18 speakers at special sessions and conferences. It included 19 officers of the United States Department of Agriculture, 25 members of the faculty of Cornell University, 7 members of the staff of the New York Station, 17 professors and experts from 10 other agricultural colleges and experiment stations, the United States Commissioner of Education, a representative of Teachers' College of Columbia University, the New York Commissioner of Agriculture, the State Entomologist, Dr. C. B. Davenport of the Carnegie Institution, Prof. L. B. Mendel of the Sheffield Scientific School of Yale University, Dr. N. Zuntz of the Royal Agricultural College of Berlin, Germany.

The total enrollment of students was 164, of whom 15 were registered in the Graduate School of Home Economics, which was conducted in close affiliation with the agricultural school. The students came from 37 States and the District of Columbia, in addition to 9 students from Canada, 2 from China and 4 from India. More than two-thirds of the students were occupying positions in the agricultural colleges and experiment stations, including at least 40 heads of departments. There was also a large number of visitors at the conferences. In the words of Dean True at the closing meeting, "probably never before had there been gathered together for so extended a period so large and enthusiastic a body of scientific men interested in agriculture."

The fourth session was held at the Iowa State College in 1910. Courses were given in plant physiology and pathology, agronomy, horticulture, animal husbandry, poultry, dairying, and for the first time in rural engineering, rural economics and sociology. In rural engineering lectures were given on irrigation, drainage, water supply, ventilation of farm buildings, and the Iowa silo. Methods of teaching agricultural engineering were also discussed.

Special interest attached to the course in rural economics and sociology as an effort to stimulate the efforts of the agricultural colleges in the establishment of more adequate courses in these subjects and the institution of research in these lines. The scope of agricultural economics and the methods used in studying this subject were presented by Dr. H. C. Taylor of the University of Wisconsin. He also described the economic status of the American farm and the issue between the farmer and the middleman. Dr. B. H. Hibbard of the Iowa State College treated agricultural cooperation, and Prof. W. J. Spillman of the United States Bureau of Plant Industry discussed farm management. President K. L. Butterfield of the Massachusetts Agricultural College outlined the field of rural sociology and discussed its place in college courses and ways of developing such courses. The American Farm Management Association was an immediate outgrowth of this course.

Another new and highly successful feature of this session was a series of conferences on extension work, in which were discussed the scope and organization of university extension work in general, the sphere of agricultural extension work, its status in the United States and European countries, some of the problems connected with this work, its organization, equipment and methods, and the qualifications of extension teachers.

"This was by far the largest and most important assemblage of persons directly connected with the extension work of our agricultural colleges. The vital relation of the proper development of this branch of agricultural education to the general success of the colleges was clearly brought out. There was also a much more definite realization of the tremendous extent and importance of the extension movement in its relations to the permanent success of American agriculture and the welfare of our rural people."

"Secondary education in agriculture occupied a new and important place in this session of the graduate school. There was a relatively large attendance of men engaged in agricultural instruction in the special agricultural schools, public high schools, and normal schools in different parts of the country." (564)

Several conferences were held at which the status of secondary education in agriculture and the organization, courses of study, equipment, and methods of teaching required in such work were discussed. There were also

conferences on agricultural journalism and the relation of agricultural education to the business of farming.

The faculty at the Iowa session numbered 57, in addition to 17 speakers at special conferences. It included 12 officers of the United States Department of Agriculture, 16 members of the faculty of the Iowa State College, 33 professors and experts from 17 other agricultural colleges and experiment stations, Dr. D. T. MacDougal of the Carnegie Institution of Washington, Prof. J. S. Pray and Dr. W. E. Castle of Harvard University, Dr. C. W. Gay of the University of Pennsylvania, Dr. E. von Tschermak of the Royal Imperial College of Agriculture of Vienna, Austria, Dr. J. C. Ewart of the University of Edinburgh, Scotland, and Prof. G. E. Day of the Ontario Agricultural College, Guelph, Ontario.

The total enrollment of students was 205, 3 of whom were women and 3 were negroes. Twelve other women were registered in the Graduate School of Home Economics. The students came from 39 States and the District of Columbia, in addition to 3 students from Canada and 1 each from Scotland, Cuba, Denmark, Russia and the Transvaal.

The fifth session was held at the Michigan Agricultural College in 1912. Courses were given in soils, plant physiology, animal physiology, agronomy, horticulture, beef and dairy cattle, swine, poultry, rural engineering, rural economics and farm management. Eight conferences were held on the principles of general and agricultural research, the scope, aim and methods of college and secondary instruction in agriculture, and of extension work. There was also a conference of instructors in rural engineering and meetings of the International Association of Poultry Instructors, the Association of Official Dairy Instructors, and the American Society of Agronomy during or before the session of the school. The faculty numbered 48 instructors in addition to 6 speakers at conferences. It included 7 officers of the United States Department of Agriculture, 15 members of the Michigan Agricultural College, 18 professors

and experts from 14 other agricultural colleges and experiment stations, Dr. T. N. Carver of Harvard University, Dr. L. B. Mendel of Yale University, Dr. Oscar Riddle of the Carnegie Institution at Washington, Prof. H. N. Ogden of Cornell University, Dr. E. J. Russell of the Rothamsted Experiment Station, England, Prof. F. H. A. Marshall of Cambridge University, England, and Dr. Oscar Loew of the Hygienic Institute at Munich, Germany.

The total enrollment of students was 180, including 41 women also enrolled in the Graduate School of Home Economics. The students came from 34 States and from Porto Rico, Canada, Russia, China, and Japan. Fifty of the 139 men enrolled were employees of the Michigan Agricultural College.

In 1914 the sixth session of the Graduate School was held at the College of Agriculture on the University of Missouri. Courses were given in genetics, agronomy, animal husbandry, horticulture, immunity and disease resistance, rural economics and farm management.

"With a view to making the instruction more systematic and satisfactory the number of instructors was more strictly limited than at previous sessions." The faculty numbered 29 instructors, including 5 officers of the United States Department of Agriculture, 10 members of the faculty of the Missouri College of Agriculture, 8 professors and experts from seven other agricultural colleges and experiment stations, Dr. J. A. Harris of the Station for Experimental Evolution of the Carnegie Institution, Dr. M. F. Guyer of the University of Wisconsin, Dr. E. M. East of Harvard University, Dr. V. A. Moore of the New York Veterinary College, Prof. A. D. Darbishire of the University of Edinburgh, Scotland, and Dr. Otto Appel of the Imperial Biological Institute, Dahlem, Berlin, Germany. Eight conferences on special topics relating to agricultural education and research were held. The total enrollment of students was 150, including two women. The students came from 32 States, the District of Columbia, Canada and Scotland. Sixty-six students were employees of the University of Missouri.

The seventh session of the Graduate School was held at the Massachusetts Agricultural College in 1916. The policy of concentration was continued and the work was restricted to two main lines, (1) the fundamental factors involved in the growth of plants and animals and (2) the economic and social factors affecting profitable agriculture and country life. The forenoon of each day was devoted to lectures and the afternoon to seminars arranged for two groups. Six conferences on matters of general interest to students of agricultural education and research were also held.

"There were 45 persons who gave instruction as lecturers or leaders of seminars and about 40 others who participated in the formal presentation of matter in the seminars and conferences. The faculty included representatives of the Universities of Illinois, Missouri, Chicago, Harvard and Yale, the United States Department of Agriculture, the Missouri Botanical Garden, Amherst College, The Young Men's Christian Association College at Springfield, Mass., the Massachusetts State Board of Education, the Vermont Department of Agriculture, Kalamazoo Normal School and the agricultural colleges and experiment stations in Indiana, Kansas, New Hampshire, New York, Oregon, Pennsylvania, Vermont, West Virginia and Wisconsin. A considerable number of members of the faculty of the Massachusetts Agricultural College participated in the work of the school. In particular the director and faculty of the regular graduate school of this college were active in the planning and conduct of the Association's Graduate School." (564)

The World War interfered with the making of arrangements for foreign representation on the faculty but Dr. Benjamin Moore of the London Hospital Medical Service and Prof. C. A. Zavitz of the Ontario Agricultural College took part in the work of the school.

The total enrollment at this session was 198, of whom about 150 were strictly students, coming from 27 States, the District of Columbia, Porto Rico, England, Canada and the Transvaal. Only about 66 students came from outside the Massachusetts Agricultural College.

In reporting on this session the officers of the school stated that while "in respect to the amount and high character of the work done, this session of the Graduate School was fully as important and successful as any which have preceded it" * * *

1521

"It is evident that the causes which have operated to depress the attendance at other sessions have increased in influence and were not overcome by unusually active measures to advertise the school this year. Among these hindrances, the most potent seem to be the great increase of summer work and other burdens on members of the college faculties, the opening up of greater opportunities for regular graduate work in agriculture at numerous institutions, and the inability of the Association's Graduate School, under present conditions, to give credit for the work done there which might be used elsewhere as part of the requirements for advanced degrees." (564)

"The future status of this Graduate School, therefore, needs very careful consideration by the Association and its constituent institutions." In transmitting this report to the Association its Committee on Graduate Study called attention to the great growth of graduate work in agriculture at the land-grant colleges.

"Data collected by the States Relations Service show that, of the 48 land-grant institutions, 25 had six or more graduate students in agriculture enrolled during the academic year 1915-16. The largest number reported was 238 and the second and third largest respectively were 99 and 65, the total for all the institutions being 938. Moreover, the six colleges which alone had data on this point reported a total of 30 of their alumni pursuing graduate study at non-agricultural institutions in preparation for agricultural work. It is obvious that systematic graduate work occupies a much larger place in our scheme of agricultural education than it did 15 years ago and that the situation has materially changed since the inauguration of the Graduate Summer School.

These facts, while gratifying, suggest the query whether the Graduate Summer School in its present form may not have accomplished to a large extent the principal object for which it was founded and raise the question what shall be the future policy of the Association as regards the promotion of graduate study in agriculture." (564)

The entrance of the United States into the World War in 1917 brought about conditions which made the future of the Graduate School still more problematical and finally in 1919 the Committee on Graduate Study recommended its discontinuance and this was approved by the Executive Body of the association.

It is believed that the Graduate School had much influence in stimulating the establishment of more thorough agricultural courses in the land-grant colleges based on the science of agriculture broadly considered and on the sciences related to agriculture. It also promoted the raising of standards for the under-graduate courses and the institution of regular graduate work. It showed the necessity of

of thorough training for agricultural teaching and research. At the same time it aided the development of research and extension work in agriculture and the spread of agricultural teaching into the secondary schools. In a way its courses and conferences represented the progress of the movement for a broader and better American system of agricultural education and research. Its membership drawn so widely from different parts of the country carried its influence throughout the land-grant college and it thus furnished much material for the discussion of curricula, methods of teaching, lines of research, organization and conduct of extension work which went on in these institutions during the period of its existence.

Development of Courses in Agriculture

Specialization of Branches of Agriculture

The division of the agricultural work of the colleges into departments began with the separation of horticulture from general agriculture. Then came departments of animal husbandry and dairying. The great emphasis during this period was on agricultural production. Matters relating to agricultural engineering or economics occupied a subordinate place and were often associated with the department of agriculture or agronomy. In 1901-2 in the Illinois College, in which the specialization of agriculture had gone furthest under the leadership of Dean Eugene Davenport, the technical portion of the courses leading to graduation occupied about half the time. There were 20 instructors in technical subjects, of whom 16 gave entire time to agriculture. In agronomy there were 6 instructors, in animal husbandry 3, in dairy husbandry 3 and in horticulture 5. Under agronomy there were 18 courses, including soils, farm crops, drainage, irrigation, farm buildings, machinery, roads, farm management and history of agriculture. Under horticulture there were 19 courses, including orchard and small fruits, vegetables, viticulture, floriculture, nut culture, forestry, landscape gardening, and economic botany. Under animal husbandry there were 20 courses,

including breeding, feeding, and management and special courses on beef cattle, sheep, swine and horses. Under dairy husbandry there were 13 courses, including breeding, feeding and care of dairy cattle, milk, butter, cheese, ice cream, dairy bacteriology and factory management. There were also 2 courses in thremmatology and 3 in veterinary science.

In 1903 the Committee on Instruction in Agriculture of the Agricultural College Association stated that the reorganization of faculties and courses on the basis of agriculture as a science was continuing.

"One effect of this movement has been to change the relation of the natural sciences to agriculture in the scheme of instruction in the agricultural colleges. As long as agriculture was taught almost wholly on a practical basis and without much regard to its pedagogical formulation, the teachers of the natural sciences were called upon not only to develop the relations of these sciences to agriculture in their courses of instruction, but to give instruction in strictly agricultural subjects, and this was done to a considerable extent, especially in chemistry and botany. Out of this grew a series of text-books and manuals in which the general principles of these sciences were more or less extensively combined with statements of their relations to the theory and practice of agriculture. Thus we have books on agricultural chemistry, agricultural botany, agricultural physics, etc. The preparation of such books was a very useful work. They helped to turn the attention of scientists to the importance of the problems of agriculture and thus led to the further investigation of these problems; they brought together many facts and principles out of which in large measure the science of agriculture itself is now being constructed."

"One result of the prolonged study of the relations of science to agriculture was to lead both teacher and student too far afield in the pursuit of problems which, though important scientifically and even economically, had too remote connection with agriculture itself to make it worth while for the student whose aim was to be a master of the theory and practice of agriculture to follow after them. Thus, for example, agricultural chemistry developed a system of analysis of fertilizers, feeding stuffs, and adulterated products which in the minds of many teachers came to be so prominent a part of this branch of chemistry that it often assumed an undue importance in the general agricultural courses in our colleges. Now we shall always need expert analysts of fertilizers and feeding stuffs, and special courses for the training of those experts should be offered in our agricultural colleges. But these should be clearly differentiated from the courses intended to lay the foundations for the scientific study of agriculture. Under the old system the emphasis was often laid so much on analytical work that the colleges produced many analysts and but few agricultural experts."

"Another unfortunate result of the old arrangement of courses in our agricultural colleges was that the study of the general principles and outlines of the various natural sciences was often unwisely abridged in order to give more attention to their economic applications."

124

"The general readjustments of science teaching which are demanded by the present development of our agricultural colleges are, therefore, first the more thorough teaching of the foundations of the natural sciences; secondly, the clearer differentiation of the courses in natural science associated with the courses in agriculture from those which are intended for the training of experts in various economic specialties related to agriculture; and, thirdly, the separation from the science courses of those subjects which may be more appropriately taught by the instructors in the various branches of agriculture itself." (566)

On the basis of the standard entrance requirements as previously stated, a general scheme for a four-year college course in agriculture was presented in which were "courses in general physics and chemistry on the assumption that these would naturally precede the study of plants and animals, whether in a general way under the head of botany, physiology, or zoology, or in a special way under the different branches of agriculture. Some knowledge of physics and chemistry is also essential to a proper understanding of even the elements of meteorology and geology, as provided for in this course. Botany has been so placed as to run along with agronomy, and physiology and zoology with the more scientific presentation of zootechny." (566)

Most of the course was prescribed but some electives were allowed in senior year, to permit specialization in some branch of agriculture.

"Agricultural experts can not, however, expect that any properly adjusted undergraduate course will fully meet their needs for training along their chosen lines. Persons who expect to enter positions in our Department of Agriculture, experiment stations, or agricultural colleges should attain at least the master's degree. And ere long the doctor's degree will be a prerequisite to entrance on the career of agricultural teacher or investigator in our colleges and universities and the National Department of Agriculture." (566)

The outline of the course is as follows:

Agricultural Course in College

Freshmen

Sophomores

Juniors

Seniors

Subjects	Hours	Subjects	Hours	Subjects	Hours	Subjects	Hours
Physics-----	150	Agriculture:		Agriculture:		Agriculture:	
Chemistry-----	150	Zootech.--60)		Agron.--50)		Dairying-70)	
Geometry and		Agron.---90)	150	Zootech.100)	150	Farm Me-)	
trigonometry-	155	Meteorology-----	60	Geology-----	120	chanics--60)	
English-----	120	Agricultural		Botany-----	60	Rural Eco-)	
Modern lan-		chemistry-----	180	Physiology--	180	nomics---60)	190
guage-----	180	Botany-----	120	Zoology-----	120	Veterinary	
		English-----	80	Psychology--	60	medicine-----	180
		Modern lan-		Modern lan-		Horticulture	
		guage-----	100	guage ----	60	and forestry-	180
		Drawing-----	60			History and	
						political	
						economy -----	190
						Ethics-----	40
	755		750		750		780

The number of clock hours assigned to each subject includes the time given to laboratory exercises, each of which would occupy two hours.

The arrangement of the college course here suggested proceeds on the assumption that it is best for the student to devote his time largely during the first two years to language, mathematics, and the fundamental sciences, physics, chemistry, and botany. He will thus be prepared for a better understanding of the more complex sciences of agriculture, zoology, animal physiology, and veterinary medicine in the second half of his course.

The course in agriculture has been arranged with reference to taking up first in sophomore year some of the simpler topics in zootechny, such as stock judging and types of breeds, which do not require scientific knowledge, but are well calculated to arouse the interest of the student in agricultural subjects. Agronomy may then be taken up systematically and run along with the study of meteorology, agricultural chemistry and botany, and the more scientific study of zootechny may be parallel with the study of physiology and zoology." (566)

Then follows an outline course in the natural sciences, based on the resumption that there will be instruction in elementary physics in the secondary school. The sciences and number of hours in this course are physics 150, chemistry 150, botany 180, physiology 180, zoology 120, geology 120, and meteorology 60.

At the same time a committee of the section of botany and horticulture of the association presented a plan for an introductory course in botany and showed how this might be fitted into the general course in agriculture by increasing the hours for botany and making modification in the time for other subjects.

Organization of Courses in Agriculture and Related Subjects

Agronomy

The department of agronomy, which in many cases included subjects within the field of agricultural engineering or farm management, was gradually restricted to production of farm crops and then was in some cases divided by the establishment of separate departments of soils and farm crops.

The syllabus of a course in agronomy reported to the Agricultural College Association by its committee on instruction in agriculture in 1898 defined agronomy as including the "theory and practice of the production of farm crops. In agronomy we need to consider the several kinds of plants grown as farm crops under the following subjects, structure (anatomy), composition, physiology and environment. Plant production in agriculture has for its object the adaptation of environment to the anatomy and physiology of the plants under cultivation, with a view to securing crops which are best suited to the uses of man or the domestic animals." (635) The environment of the plant was said to consist of factors above ground (climate) and under ground (soil). Under climate the relation of light, heat, moisture and air to plant growth were to be considered. Under soil the main subdivisions were functions, origin, properties (chemical and physical), temperature, air, moisture (sources and amounts from the water table, hygroscopic moisture, rainfall and irrigation), drainage, tillage, fertilizers, waste and renovation.

Farm crops were then to be considered in a general way with reference to their classification and methods of improvement by breeding and selection. Finally each farm crop selected for study was to be treated with reference to its structure, composition, physiology, botanical relations, varieties, geographical distribution, culture, harvesting, preservation, uses, preparation for use, obstructions to growth, reservation or use (weeds, fungi, bacteria, insects, birds, quadrupeds and the means or their repression), production, marketing and history.

In 1903 the Office of Experiment Stations published an account of the courses in agronomy at six land-grant institutions. ⁽⁵⁸²⁾ These were selected as being in a general way typical of the work in this subject at institutions in which courses in agronomy had been differentiated from those in the general subject of agriculture.

At the Alabama Polytechnic Institute agronomy was included in the general course in chemistry and agriculture. Agronomy was given during the second and third terms of sophomore year and included lectures (with the use of books and other literature as reference material), two hours per week on soils and on the staple crops of Alabama, forage crops adapted to the South and plants valuable for the renovation of soils. Two afternoons per week were devoted to farm practice. Three small barns and a gin room served partly as laboratories for students when engaged in indoor work. Plots on the experiment station farm and collections of varieties were used as object lessons. The course in agricultural chemistry was given in senior year through lectures (two per week during second and third terms) on the origin, composition and classification of soils, composition and growth of plants, sources of plant food, improvement of soils, manufacture and use of fertilizers, and chemical principles involved in rotation of crops, feeding of livestock, etc. Laboratory work six hours per week was on quantitative analysis.

At the Michigan Agricultural College instruction in agronomy was given by the professor of agronomy and one assistant during four years and was supplemented by

instruction in botany, bacteriology and chemistry. Until the end of the first term of junior year all four-year agricultural students pursued the same studies but were allowed to specialize during the rest of their course. In bacteriology an elective course in soil biology was offered in senior year. Agricultural chemistry was required in sophomore year and elective in senior year. It included composition of plants, soils, manures and manuring, conservation of fertility, ripening of grain, etc.

The courses in agronomy began with lectures on soils in freshman year, illustrated with samples, lantern slides, and field observations. In the first term of sophomore year there were lectures and laboratory work in agricultural physics, including mechanical analysis of soils, moisture determination of soils and plants, and subjects relating to rural engineering and farm mechanics. The second term of sophomore year was devoted to farm crops. In junior year there was one elective course on "agricultural experimentation" and in senior year on soil physics. There were laboratories for agricultural physics and mechanical analysis of soils, and a soils laboratory containing considerable special apparatus, soil samples, etc. The college farm had over 250 acres devoted to grasses, roots, cereals, forage crops and pasture. There was a large collection of modern types of implements and machines.

At the College of Agriculture of the University of Minnesota agronomy was taught in the secondary school of agriculture and in college courses. Much relating to soils, fertilizers, crops and farm machinery was taught in an elementary way under agricultural chemistry, physics and botany. Practical instruction under the head of "agriculture" was given on soils, drainage, irrigation, field crops and farm management.

In the first two years of the college course the sciences related to agriculture were taught. The technical agricultural subjects were mainly electives in junior and senior year. The college course in agronomy included soil physics, field crops and seed and plant breeding. Instruction in soil physics was given in the

divisions of agricultural physics and agricultural chemistry, and the rest of the course was given mainly by the professor of agriculture.

"Under the head of field crops and seed are considered the botany, cultivation, use and place in the rotation of the various cereal, forage, root, fiber, sugar, and miscellaneous crops. Special attention is given to the subjects of permanent, rotation, annual, and shift pastures and to soiling crops; to permanent and rotation meadows, and to the production and preservation of all kinds of dry-cured and ensiled fodders. A thesis on one or more field crops is required of each student."

"The work in plant breeding includes instruction on such subjects as heredity, variation, science of breeding as an art, improvement by nature and under scientific experimentation."

"Elective practicums give opportunity to gain practical experience, to acquire greater manual dexterity in doing farm work, to secure practice in conducting experiments, and to gain experience in teaching agricultural subjects." (582)

There was a special laboratory for work on seeds and plant-breeding.

Lantern slides were extensively used, together with maps and designs of farm plans. Collections of dried weeds, grasses and forage plants and seeds were made for the use of students. Much farm machinery was available on the college farm and the vicinity. About 150 acres were devoted to college and station work. The plant-breeding experiments were extensive and involved the use of special machinery. Students assisted in these experiments. Farms in the vicinity served as a basis for designing farm plans and working out problems in farm management. Instruction was almost entirely by lectures. Students were required to write theses.

At the Industrial College of the University of Nebraska four-year agricultural courses leading to the degree of bachelor of science were in "a technical group, a general group and two special groups." The technical group was intended for graduates of the three-year course in the secondary school of agriculture connected with this college. The general group was for those students desiring "a broad and general education". The special groups were for students "fitting themselves to be instructors in agricultural subjects or to be experiment station workers." In Freshman year all courses were required but after that the courses were mostly elective. Agronomy courses included "soils, field crops, farm manage-

ment and the care and use of farm machinery." There were general courses on soils and field crops, followed by a laboratory course on the properties of soils and elective courses on methods of investigation with soils and with crops, plant food in the soil (with a series of pot experiments), production and movement of crops as affecting prices, and sugar beet culture. Instruction was by lectures and laboratory practice, with use of reference books and experiment station literature. There were special laboratories for field crops, soils and seeds. About 50 acres of land were used for purposes of instruction, in addition to the extensive experimental fields.

At the College of Agriculture and Domestic Science of Ohio State University the course in agronomy was preceded in the freshman and sophomore years by instruction in agricultural chemistry, physiological and economic botany, plant pathology and horticulture. In the course in agricultural chemistry there was instruction regarding the composition of cultural plants, soils and fertilizers; soil exhaustion and amelioration; barnyard manure, its sources and preservation; use of commercial fertilizers, methods of determining the needs of soils, etc. Under plant pathology the fungus diseases of cultivated plants and their prevention were main features of the course. The courses in agronomy were given by the professor of agriculture and the instructor in agronomy and included two elementary courses in junior year and two advanced elective courses in senior year. There was first an elementary course in soils. This included lectures and recitations on the origin, formation, kinds and physical properties of soils and their improvement by cultivation, fertilization, drainage and irrigation. There were laboratory practicums once a week on physical properties of soils and mechanical analyses. The elementary course in farm crops dealt in a similar way with the history, production, cultivation, harvesting and marketing of farm crops and there were practicums with growing and dried specimens of grasses, clovers and other forage crops. The advanced course in soils consisted of lectures and recitations

ince a week on the physical properties of soils; the relation of soils to heat, air and moisture; the effect of fertilizers on soil structure and fertility; and considerations of practical methods of tillage, as affecting crop producing power of the soil. There were laboratory and field experiments during two periods each week. The advanced course in farm crops dealt similarly with the effect of climate, soil and markets on the distribution and adaptation of farm crops in the United States, the best methods of crop production and the consumption of farm crops, with practicums twice a week. The soil physics laboratory was equipped with special apparatus, much of which had been devised at the college. There was also a large glass house with tracks, trucks and pots for tests with soils and fertilizers. Mechanical analyses of typical soils were made. In the study of crops large use was made of dried specimens and a grass garden. Observations and studies were also made on the college farm.

At the College of Agriculture of the University of Illinois out of 130 credits required for graduation 15 were required to be in agronomy and there were also elective courses in that subject. In the department of agronomy 15 courses were offered (not including those in farm mechanics), in drainage and irrigation, farm crops - quality and improvement, farm crops - germination and growth, special crops, field experiments, soil physics and management, special problems in soil physics, soil bacteriology, fertilizers, rotations and fertility, investigation of the fertility of special soils, history of agriculture, comparative agriculture, German agricultural readings, special work in drainage and machinery, investigation and thesis.

The department of agronomy had four principal divisions, soil fertility, soil physics, soil bacteriology and farm crops. Instruction was by the laboratory method, as well as by text-books, lectures and reference readings. Two well equipped laboratories were provided for work in soil fertility, an analytical laboratory and a pot-culture laboratory in a greenhouse. There were also two

1334
laboratories for soil bacteriology and two for work on farm crops. Several acres of land were devoted to plat experiments by the students. In the department of agronomy there were six regular instructors, besides several student assistants.

The number of teachers and investigators in the field of agronomy grew rapidly during the early years of the 20th century. According to Carleton in 1900 there were three agronomists at the land-grant colleges, in 1905 there were 50 and in 1908 there were 99. That year about as many more were employed in the United States Department of Agriculture. These technical workers in a field which by that time was fairly well defined formed the American Society of Agronomy on December 31, 1907. The two great divisions of the subject were represented in the choice of the principal officers. M. A. Carleton of the Bureau of Plant Industry, who dealt with farm crops, was elected president, and Thomas L. Lyon, who in 1906 had been made professor of soil technology at Cornell University, was elected secretary. Through its proceedings, which were published in 4 volumes (1909-1912), and its Journal issued continuously since that time, this society has contributed much toward the systematization of agronomy and the classification and development of its various divisions. At its meetings there have been a considerable number of papers and discussions on courses of study and the progress of the science as shown in the technical papers has suggested many items which have been incorporated in the later courses of study in this field.

During this period the study of soils was profoundly affected by the physical researches of such investigators as King and Whitney and by the development of soil bacteriology. This led to the classification of soils on a much broader basis than had been attempted by the geologists and chemists. The elaboration of soil surveys and the beginning of conducting them on a nation-wide stimulated interest in soil work on the part of both teachers and students. The revival of the Mendelian theory gave greatly increased interest to the study of plant breeding. Studies of methods of conducting plat experiments (such as ear-row

plantings and the centgener method), devices for seed-testing, the development of a system of seed inspection, the treating of seeds and plants to prevent diseases, the devising of methods and score cards for the judging of grain are examples of the things by which the programs of courses on farm crops were improved and enriched.

Horticulture and Botany

In the early days of the agricultural colleges the work in botany was often organically associated with that in horticulture. The first of the colleges to develop horticulture as a separate subject were those in Michigan (1867), New York (1874), Ohio (1876) and Iowa (1876). As research and instruction in plant physiology and pathology developed the relations between courses in botany and horticulture became in some respects more intimate; even though work in these lines was given in separate departments. This intimacy was recognized in the Association of Agricultural Colleges when in 1892 a section on horticulture and botany was established. For several years this section dealt principally with subject-matter relating to plant pathology. However, in 1895 the section was represented in the general session of the association by a paper on the teaching of horticulture. From this and the discussion which followed it appeared that only in a few colleges was there much laboratory or practical work connected with the courses in horticulture. Interest in practice work in laboratories, greenhouses and fields was promoted by this section during the next few years by papers describing what was done in some States. In the general course in agriculture proposed by the Committee on Instruction in Agriculture (554) in 1897 horticulture and forestry were allotted 180 hours. In 1902 the report of the Section on Horticulture and Botany showed that in most of the colleges horticultural instruction began with the sophomore year and that there was a decided movement (635) to emphasize laboratory and field work and "to replace the lecture with the practicum."

A committee of this section reported in 1905 in favor of dividing the 180 hours assigned to horticulture in the general horticultural course proposed by the Committee on Instruction in Agriculture as follows: Propagation 20, pomology 50, olericulture 50,

floriculture 30, landscape horticulture 30. They also advised that the study of the horticulture should begin before ~~a~~ senior year in order to give opportunity to take advantage of elective courses in that subject, most of which were given in the last two years.

A schedule for a horticultural course, parallel with that in general agriculture, was also given. This provided 270 hours of botany, equally divided between the first three years, 175 hours of electives in senior year, and horticulture as follows: sophomores, propagation 60 hours; juniors, pomology 120; olericulture 120; seniors, pomology 80, floriculture 75, landscape gardening, 60, forestry 40. A table was given, showing the number of required and elective hours in horticulture at 9 colleges. The required hours varied from none at the New York College to 266 in Massachusetts. The aggregate number of hours of electives in the different colleges were as follows: New York 360, Illinois 900, California 180, Michigan 430, Pennsylvania 342, Missouri 162, Massachusetts 638, Ohio 450, New Hampshire 270.

The statistics of the land-grant colleges show that in 1903 there were in the separate horticultural courses of four years 539 students and in short courses 367. For some reason the number of students specializing in horticulture declined for several years and in 1909 there were 158 in the four-year course, and 233 in short courses. Then the number began to rise again and in 1911 there were 243 in the four-year course and 565 in short courses.

As specialization proceeded in the agricultural colleges separate departments of horticulture were provided and then during the period now under consideration professorships were created for different branches of horticulture. Pomology most commonly received this recognition. The Massachusetts Agricultural College established a Division of Horticulture, with separate departments of pomology, floriculture and landscape gardening.

Relatively little attention was given to instruction in vegetable growing prior to 1908, though Bailey's Principles of Vegetable Gardening, the first textbook on this subject for college students, appeared in 1901. In 1908 "there were not more than four or five vegetable specialists in the colleges." From that time interest in this subject increased. "In 1912 five institutions offered for four-year students as many as three to five courses in vegetable gardening, 9 offered two courses and 21 offered single courses.

When investigations in plant pathology led to the invention of practical methods of control of plant diseases through spraying, seed treatment, etc. much attention was often given to these matters in connection with courses in horticulture, though the broader and more technical phases of this subject were usually treated in the department of botany or one of its subdivisions.

In 1887 Joseph C. Arthur began service at Purdue University as professor of vegetable physiology and pathology.

Forestry

As late as 1897 the only instruction in forestry in American colleges consisted of lectures on dendrology and forest geography in connection with courses in botany and similar work, together with some practical matters connected with the growing of ornamental trees and farm woodlots, in horticultural courses.

The first professional school of forestry was established at Cornell University in 1898 and about the same time the private school at Biltmore, North Carolina, was organized. The following year the Pinchot family endowed the Forest School in connection with the Scientific School at Yale University. Meanwhile the National Government had entered on the policy of making reservations of large areas of public land for forests and parks and these reserves were administered by the Interior Department.

The Department of Agriculture, through its Forestry Division under Dr. B. E. Fernow and later Gifford Pinchot, was broadly stimulating interest in the study of forest problems. By 1900 there were State offices for forest work in 13 States. The American Forestry Association, with the Secretary of Agriculture, James Wilson, as president, was in active operation. That year some instruction in forestry was reported from land-grant and other colleges in 39 States.

At the meeting of the Agricultural College Association in 1905 a resolution was passed urging "that the national forestry policy of this country should include provision for education and experimentation in forestry by the agricultural colleges and experiment stations of the different States and Territories."

In 1905 the management of the National Forest Reserves was transferred from the Interior Department to the Department of Agriculture, and the Bureau of Forestry became the Forest Service.

Under the broad conservation policy of President Roosevelt the area of the National Forests was greatly increased. Considerable areas of private forests were also put under management recommended by the Forest Service. While in 1898 the Division of Forestry employed only eleven persons, of whom two were professional foresters, in 1905 the employees of the Forest Service numbered 821, of whom 153 were professional foresters and in 1909 there were 2,012 employees. There were also many persons employed in forestry work in other ways.

One result of this expansion of forestry work was much greater interest in forestry instruction in educational institutions. Students flocked into the forestry classes in order to prepare themselves for Civil Service examinations or other opportunities for work in this line. Whereas in 1907 the reports of the land-grant colleges showed 114 students in four-year courses in forestry and 79 in short courses, in 1911 there were 449 in the long courses and 411ⁱⁿ the short courses.

The Civil Service Examinations for the Forest Service helped to set standards for the courses in forestry in the college. Further effort in this direction was made at a conference held in Washington in 1908, in which 15 universities and colleges participated. A committee, of which Henry S. Graves was chairman, formulated a plan for the standardization of education in forestry and made a report at a second conference in 1911. It soon appeared that thorough professional training in forestry was expensive for the colleges and required more than undergraduate work, and that the number of positions open to the students in the advanced courses was quite limited. It therefore seemed best to most of the colleges to confine their forestry work to such courses as would prepare men for positions as rangers and other subordinate work in forest services, or fit farmers to properly manage their woodlots.

In an article on Forest Education, by Henry S. Graves and R. Zon of the Forest Service, published in 1911, the schools teaching forestry were put into four groups: (1) Graduate schools, including the Yale Forest School, Course of Forestry at University of Michigan, and the Division of Forestry in the School of Applied Science at Harvard University; (2) Undergraduate schools at the Universities of Minnesota, Montana, and Washington; Colorado College, Biltmore, N. C., Pennsylvania State Forest Academy and land-grant colleges in 11 States; (3) ranger schools, including a number of short courses in undergraduate schools; (4) courses in Forestry in 21 land-grant colleges and 3 others; and (5) 6 secondary schools. In 1910, 144 normal schools were also reported as giving some instruction in forestry.

Animal Husbandry

In 1899 the Committee on Agricultural Instruction presented to the Association of Agricultural Colleges a syllabus of a course of zootechny framed with reference to its incorporation in the four-year college course in agriculture. The term zootechny had been adopted from foreign usage, particularly in Germany, as indicating more definitely the scientific character of this course but this term did not acquire

general usage in the colleges in this country, the more easily understood expression "animal husbandry" being commonly used. The committee defined zootechny as the theory and practice of the production of animals useful to man (exclusive of the diseases of animals usually taught in a separate department under the head of veterinary science). The animal was to be studied in a general way under anatomy, physiology and management which included animal types, breeding, feeding, hygiene and systems of management. "Animal production in agriculture has for its object the securing and growing of animals which, in themselves or in their products, are best suited to the uses of man." The useful animals were classified under mammals, birds, fishes, beneficial insects and such animals as frogs, oysters and snails. Then followed the principles governing the choice and breeding of animals, types and breeds of different kinds of animals, principles of feeding, practice in feeding different kinds of animals, principles of hygiene and management and practice in the management of different kinds of animals. The committee, however, stated that there were "some important considerations which may be urged in favor of teaching the principles of the different branches of zootechny together before taking up the application of any of them to different kinds of animals." By this time animal husbandry had an important place in the general agricultural course and through the elective system students had opportunities for specializing in breeding, feeding or management or on particular kinds of animals.

In animal husbandry much interest was developed in the study of types and breeds of different kinds of animals. Some of the colleges acquired considerable numbers of animals of different kinds and breeds. Purebred stock was brought into the college herds and the animals often had excellent records. Great importance was attached to the judging of animals and students were given much practice in this work, which was also promoted on a wide scale by competitive tests. More attention was also given to studies of the principles of breeding and these studies were

stimulated by the experiments in breeding conducted at many of the experiment stations. Instruction in feeding was put on a quite strictly scientific basis and much attention was paid to the compounding and use of rations for different purposes. The preparation, storage and use of silage and the kinds of crops best adapted to this purpose were carefully considered. Many colleges undertook the preparation of animals for exhibition at fairs and their success in competition with practical livestock men, notably at the International Live Stock Show at Chicago, undoubtedly increased the prestige of the colleges among farmers and greatly stimulated the interest of students in animal husbandry. Some of the colleges employed special instructors for different kinds of animals. This was particularly true with reference to dairy cattle. In some institutions dairy husbandry was united with dairy manufacture in a single department. In most colleges there was some instruction regarding poultry, and in some cases a separate poultry department was established. Both meat and egg production were studied, as well as breeding for these purposes and there was training and practice in caponizing, treatment of diseases, use of incubators and brooders, construction of poultry houses, etc.

Agrotechny

While no college organized a department of agrotechny there was more or less instruction in scientific or agricultural departments of the land-grant colleges on subjects within that field and particularly with reference to those matters which were locally important. These included such things as sugar making, vegetable and animal oils, vinegar, concentrated foods and feeds, canned goods, textiles, leather, fertilizers, etc.

Dairying

In many States dairying was sufficiently important to bring about a separate department for that subject. And in some cases this was subdivided and a number of specialists employed as instructors. Interest in dairying was greatly promoted by the invention of the Babcock milk tester in 1890 and the growing

movement for the establishment of creameries and cheese factories, the increase of scientific knowledge, particularly in bacteriology, regarding the requirements for the sanitary handling of milk and other dairy products, and the consequent control measures under public laws and regulations. Thus there was offered a broad opportunity for the agricultural colleges to do useful public service through instruction in farm dairying and also through the training of managers and operators of the milk business and the manufacture of butter, cheese and ice cream, as well as of public officials for the inspection services relating to dairy products.

A general course in dairying as a part of the four-year agricultural course was formulated by the Committee on Instruction in Agriculture in 1900. This included the raw material (milk), its source, standard, handling and uses; milk and cream for consumption (preparation for sale, and delivery and sale); butter and cheese making (processes and equipment); butter and cheese properties, standard, handling, marketing and uses.

Special courses in the science and practice of dairying had already been established at a few colleges and these were increased in number and variety in after years. In some cases the dairy department was run largely on a commercial basis for the production, purchase and delivery of milk and the manufacture and sale of other dairy products. The practical study of economic problems relating to an agricultural industry may be said to have begun in some of the dairy departments of these colleges.

The equipment of the dairy departments often included much scientific apparatus for chemical, physical and bacteriological studies and outfits of machinery and other appliances on a scale approximating those of commercial concerns. In some institutions special buildings were erected for the dairy departments.

Rural Engineering

For Rural Engineering as part of a general course in agriculture the Committee (635) on Instruction in Agriculture outlined a tentative syllabus in 1900. ^ This subject was then defined as "the science and art of laying out farms, designing and constructing farm buildings and works including water, irrigation, drainage and sewage systems and roads and the construction and use of farm machinery." The committee also urged the "need of the establishment of thorough courses in rural engineering in some of our higher institutions, in order that well-trained rural engineers may be produced to act as leaders in the advancement of engineering enterprises for the benefit of agriculture."

In 1901 the committee again called the attention of the Association of Agricultural Colleges to this subject, pointing out that up to this time "there has been comparatively little development of courses in rural engineering in our colleges and universities" though there were beginnings of such courses at a few institutions. "For example, a department of irrigation has recently been established at the University of California and arrangements have been made for special courses in irrigation at the Colorado Agricultural College." Irrigation was a live subject at this time because of its growing development in the West. The activities of the Office of Experiment Stations through its Irrigation Investigations begun in 1898 and extended to both arid and humid regions, in cooperation with the agricultural colleges, were stimulating interest in this matter in these institutions. This came to a head at the meeting of the association in 1902 when the following resolution was adopted:

"Whereas the agricultural colleges and experiment stations, as well as the U. S. Department of Agriculture, are broadening their work relating to irrigation and farm machinery and other lines of agricultural engineering, and there is pressing need of the more definite formation of plans for this work: Therefore, be it

Resolved, That this Association make provision for the appointment of a standing committee on agricultural engineering, to consist of five members, and that it be made the duty of this committee to cooperate with the Department of Agriculture in promoting education and research along the different lines of agricultural engineering." (635)

141

The committee appointed under this resolution was W. E. Stone of Indiana, A. R. Whitson of Wisconsin, C. S. Murkland of New Hampshire, S. Fortier of Montana, and Elwood Mead of the Office of Experiment Stations. They made a report in 1903 showing the opportunities for education and research in the different branches of agricultural engineering and recommended "the creation of separate departments of rural engineering in the colleges." That year the report of the Office of Experiment Stations describes courses in various branches of rural engineering at the College in Illinois, Minnesota, North Dakota and New York. In Wisconsin where instruction in this subject had been given for several years in the department of agricultural physics the State legislature had made an appropriation of \$15,000 for a farm engineering building and an assistant professor of agricultural engineering had been appointed. At the Iowa College a department of farm mechanics had recently been established and a substantial building erected for its use.

(Vol. 15, p. 219)

The work of this department was described in the Experiment Station Record, as follows:

"The aim will be to make the collegiate course thoroughly practical. Students will be trained in the fundamental principles of construction of farm machinery, and in setting up, operating, and adjusting of various kinds of implements. Besides farm machinery, the department embraces instruction in farm drainage, road construction, irrigation, planning farm buildings, mechanical drawing, carpentering, blacksmithing, and horseshoeing. Courses are provided in farm and field machinery, in farm power machinery, in drainage, and farm buildings, and opportunity is offered for postgraduate work. A number of postgraduate students are taking farm mechanics this year as a major study, with the expectation of fitting themselves for teaching this subject, and many inquiries are being received from prospective students."

In 1904 125 students were enrolled in this department of the Iowa College, and Indiana, Kansas, Nebraska and Wyoming were added to the list of States in which instruction in this subject was given. Special buildings for this work had been erected in Minnesota and Nebraska. In 1905 the Committee on Rural Engineering called attention to the need of more adequate attention to this subject in the colleges in general and advised that a few institutions should establish independent departments

of rural engineering to be manned by persons with engineering training, who should be given full professorial rank. The American Society of Agricultural Engineers, was organized in December, 1907, at the University of Wisconsin.

In 1906 a subcommittee of the Committee on Instruction in Agriculture reported that at least 32 colleges were offering "some instruction which may be classified under the head of 'Rural Engineering'."

"The amount and quality of this instruction varies widely, and the fact that this branch of agricultural education is at present in an extremely unsystematic and unpedagogic state is impressed by a study of the data at hand. There is no uniformity in the nomenclature of subjects taught and no common understanding as to their scope or application." (649)

This committee in 1908 called attention to the necessity of distinguishing between a short course in agricultural engineering as a part of the general course in agriculture and a long professional course for the training of engineers qualified to pursue some branch of rural engineering. In 1910 Iowa State College offered a four-year course leading to the degree of bachelor of science in agricultural engineering. For the most part the agricultural colleges have been content to give limited courses in this subject. Only a few colleges have erected special buildings for this work or offered degree courses in rural engineering.

Rural Economics

Rural economics was recognized as a division of the science of agriculture in the first report of the Committee on Instruction in Agriculture in 1896 and in 1897 was given 60 hours out of a total of 486 hours allotted to agriculture in the general course of study. A brief syllabus was presented in 1900, giving the following definition: "Rural Economics treats of agriculture as a means for the production, preservation and distribution of wealth by the use of land for the growing of plants and animals. It may include the development of agriculture as a business (history of agriculture), as well as the facts and principles of farm management under present conditions." (635)

The early treatment of this subject by this committee was evidently crude and tentative. In its first report the subject is expressed alternatively as "rural economy or farm management" and in the syllabus the two main divisions of rural economics are said to be history of agriculture and farm management, under which marketing is one of the subdivisions. However, these reports stimulated interest in this subject and helped the movement for greater recognition of the economic problems of agriculture in the agricultural colleges. There had been some teaching of subjects in the field of rural economics in these colleges from the beginning but for the most part this was incidental and not well organized. In 1901 the committee again called attention to this subject as follows:

"As yet there has been comparatively little development of distinct courses in rural engineering and rural economics in our colleges and universities. Beginnings of such courses have been made at a few institutions. For example, a department of irrigation has recently been established at the University of California and arrangements have been made for special courses in irrigation at the Colorado Agricultural College. There has also been some provision for lectures on agricultural economics at the University of Wisconsin. It is hoped that some of our stronger agricultural institutions will soon take a more active interest in the establishment of courses in rural engineering and rural economics. These subjects embrace matters of great importance to our agriculture, and their serious consideration in our higher institutions for agricultural education may do much to promote the best development of our agriculture. We need to broaden our agricultural courses along these two general lines." (635)

By 1903 the beginnings of distinct courses on the economic problems of agriculture were in operation in colleges in Wisconsin, Massachusetts and some other States. At the Ohio State University a course on the history of agriculture and rural economics was offered and Prof. H. C. Price, who succeeded T. F. Hunt as dean of the ~~College~~ of Agriculture, was also designated professor of rural economy. In the ~~College~~ of Agriculture, Department of the University of Minnesota a course in "agricultural economics" was offered. In the reorganized curriculum of the New York State College of Agriculture at Cornell University rural economy was given as one of the main branches of agriculture and courses were offered in farm accounting and the economics and history of agriculture.

At the Rhode Island College of Agriculture and Mechanic Arts courses in farm management and rural economics were given and President Butterfield prepared for the report of the Office of Experiment Stations in 1903 an outline of a short course in agricultural economics suitable for incorporation in the general college course in agriculture. (538) That report also contained an article describing the courses in rural economics in European agricultural schools. At that time Dr. H. C. Taylor, in his capacity as instructor in commerce at the University of Wisconsin, was giving a course in agricultural economics. Meanwhile the Office of Experiment Stations was studying legal and economic problems in connection with its Irrigation Investigations and in 1905 Dr. Taylor was employed in this work. This afforded an opportunity to begin a department of rural economics in the Experiment Station Record, with Dr. Taylor as editor. The same year his book entitled "Introduction to the Study of Agricultural Economics" was published.

At the meeting of the American Association for the Advancement of Science at St. Louis, Mo., in December, 1903, a session of the Section on Social and Economic Science was devoted to a discussion of the economic aspects of agriculture. Papers were read by Dr. Taylor on Agricultural Economics; W. M. Hays of Minnesota on Improvement in Farm Management; C. F. Curtiss of Iowa on The Economic Functions of Live Stock; and H. Sherrard on The Function of Forestry in the New Agriculture.

When the problem of conservation of our natural resources became acute and President Roosevelt called the great conference on this subject at the White House in May, 1908, the very great economic importance of agriculture was stressed in the discussions at this conference. The year before at the semi-centennial of the Michigan Agricultural College the President had declared that the problem of the farm was much more than the growing of crops and live stock.

"The problem of production has not ceased to be fundamental but it is no longer final; just as learning to read and write and cipher are fundamental but are no longer the final ends of education. We hope ultimately to double the average yield of wheat and corn per acre; it will be a great achievement; but it is even more important to double the desirability, comfort, and standing of the farmer's life." (635)

Following up this matter in August 1908 he appointed the Commission on Country Life. In making this appointment he said:

"The farmers have hitherto had less than their full share of public attention along the lines of business and social life. There is too much belief among all our people that the prizes of life lie away from the farm. I am therefore anxious to bring before the people of the United States the question of securing better business and better living on the farm, whether by cooperation between farmers for buying, selling, and borrowing, by promoting social advantages and opportunities in the country, or by any other legitimate means that will help to make the country life more gainful, more attractive, and fuller of opportunities, pleasures, and rewards for men, women, and children of the farms." (531)

The commission consisted of Dean L. H. Bailey, of the New York State College of Agriculture, chairman; Mr. Henry Wallace, editor of Wallaces' Farmer; President Kenyon L. Butterfield, of the Massachusetts Agricultural College; Mr. Gifford Pinchot, of the United States Forest Service; Mr. Walter H. Page, editor of World's Work; Mr. William A. Beard of California; and Mr. Charles S. Barrett of Georgia. Dr. E. W. Allen of the Office of Experiment Stations acted as its executive secretary.

"The purpose of the commission, as stated in the President's message to Congress transmitting the report of the commission, was 'not to help the farmer to raise better crops, but to call his attention to opportunities for better business and better living on the farm.'" (531)

In commenting on the work of this commission an editorial in the Experiment Station Record (Vol. 20, p. 60) stated that it "broadly emphasizes the need, hitherto chiefly felt within a comparatively narrow circle, of broadening the scope of our agricultural colleges and the State and National departments of agriculture. So far these institutions have directed their energies mainly toward stimulating agricultural production."

"The time has now come for exact and comprehensive studies of the economic and social conditions of agricultural communities."

"The awakening of interest in the economic and social problems of agricultural communities which is bound to follow the inquiries of the Commission on Country Life will have only a transient effect unless it is succeeded by the establishment of permanent institutions for the study of such problems and the preparation of experts in these lines. When we consider the vast extent of our country and the varied character and environment of our agricultural people it can hardly be expected that any satisfactory solution of the complex economic and social problems of different

regions can be reached until after many years spent in the most careful study of local conditions by thoroughly trained experts. At present we have neither the facts nor the experts.

To secure the experts it will be necessary to broaden the work of our agricultural colleges and build up in them strong departments of agricultural economics and sociology. A beginning has been made in this direction, but present provision for such studies is wholly inadequate. It seems likely that the same process of evolution must go on in these departments as has occurred in the departments for agricultural production. First, a few men will roughly block out the problems and attempt instruction on them. Then the need of research will be apparent, and fragmentary efforts will be made in this line. But the departments of instruction in agricultural economics and sociology will never be in satisfactory condition until agencies for systematic research in these lines are established and have done considerable work.

Herein lies a great opportunity for the National and State departments of agriculture and the agricultural colleges. It is the joint work of all these agencies which alone will secure the best results."

For the reasons set forth in this article the work in rural economics in the agricultural colleges grew slowly. The new knowledge necessary as a basis for strong courses in this subject was accumulated in only small measure prior to the World War and only a few men devoted themselves to investigations in this field.

A group of men whose training and experience had been chiefly in the field of agronomy undertook studies in farm management and following some foreign precedents were inclined to regard this subject as a distinct branch of knowledge outside of rural economics. Discussion of this and other matters relating to the courses in rural economics arose in the colleges. Finally the suggestion was made that a committee of the Association of Agricultural Colleges should report on "terminology, lines of cleavage and content of courses" relating "to the economic aspects of the production and marketing of agricultural products." The Committee on Instruction in Agriculture undertook an investigation of this subject in 1910. That year the American Farm Management Association had been formed and had "adopted in a tentative way an analysis of the rural problems as outlined by President Butterfield, viz: (1) The technical aspect - farm practice or agriculture; (2) the business aspect - farm administration or farm management; (3) the scientific aspect - agricul-

tural science; (4) the industrial aspect - agricultural economy; (5) the community aspect - rural sociology." This was taken as a basis for work of the committee.

The views of a number of the leading officers of the agricultural colleges especially interested in rural economics and farm management were obtained and published.

Foreign works on these subjects were also examined. The following statements are taken from the conclusions of the committee as contained in its report in 1911:

"It is apparent from the communications which have been read that first, there is a demand that the line of cleavage should be determined between the course of study which deals with the economic problems in agriculture and the courses of study known at present as agronomy, horticulture, animal husbandry, dairying, and rural engineering, and, second, there is a general consensus of opinion, although not entirely unanimous, that there are two classes of subject matter in the field of economics. One class of subjects deals with the farm as a unit; the other deals with the community as a unit; when differentiated, the course of study dealing with the first class of problems has been usually, but not always, called farm management; the course of study dealing with the second has perhaps always been called rural economy or economics or agricultural economics, unless further subdivision has taken place.

It is also evident from the discussion that, in some cases at least, different names have been given to the same matter.

The subject taught or investigated under the head of farm management, as related to the organization and management of individual estates devoted to agriculture, in the judgment of this committee, necessarily involves the application of the principles of economics. These principles constitute the scientific basis of farm management and give this subject its only just claim for consideration as having a pedagogical value entitling it to a place in courses of study or a scientific standing as related to problems of investigation."

"Some teachers and investigators with a thorough knowledge of farming and either by temperament or training with little interest in philosophical studies have approached the economics of agriculture from the standpoint of farm practice. Some even maintain that it is the only scientific way of approaching the subject.

Other workers in the field, thoroughly trained in economic theories, but perhaps less experienced in farm methods, have developed their subject largely from the philosophical point of view."

"It is obvious that the ideal to be desired is for the teacher and investigator to bring to these economic problems the training and point of view of both the economist and the agriculturist. The present discussion regarding the respective fields of rural economics and farm management will prove of great benefit to agricultural education and research, if it serves to emphasize the fundamental importance of thorough practical and scientific training for teachers and investigators who deal with the complex problems of rural economics, whether these relate to the rural community or the individual farm."

"Furthermore, a whole-hearted attempt should be made to develop this important branch of agricultural study in all our agricultural colleges. At least one man in each institution should devote his time to economic problems relating to agriculture."

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"It seems desirable to use the term rural economics as applicable to the general field of economics in its relation to agriculture and rural communities. The term farm management may properly be restricted to that phase of rural economics which deals with the business organization and direction of individual farm enterprises, or, in other words, deals with the farm as a unit.

Rural economics is preferable to agricultural economics because the former term indicates that the affairs of the community, as well as of the individual farmer, are to be considered under this head. Rural economics or economy has for a long time been used in this sense in this country and abroad, and there does not seem to be sufficient reason for departing from this usage."

"But besides the more general courses in rural economics there will undoubtedly be an increasing number of courses treating of various subdivisions of this subject, in addition to farm management. Such, for example, would be courses in farm accounting, cooperation and credit, farm labor, markets and marketing, taxation, etc.

There is another group of rural problems which is quite clearly differentiated from rural economics and forms a branch of social science or sociology, to which the name of rural sociology may be appropriately applied. Rural law and legislation, history of agriculture, and comparative agriculture are also subjects more or less distinct and separate. For the present, however, it may be desirable to put such subjects in some other department in order that some attention may be given them in the scheme of college courses in agriculture. As the resources of the agricultural colleges increase and trained specialists along these lines are available, separate chairs should be established to represent these important subjects.

Your committee is deeply impressed with the importance of developing strong courses in rural economics and sociology and the other subjects just referred to. These all involve the human element in agriculture and country life. They tend to raise the college courses in agriculture above the materialistic plane, to emphasize broadly the human interest that properly inheres in agricultural studies, and thus to inspire both faculties and students in our agricultural colleges with a higher sense of the wide responsibilities attaching to leadership in agricultural affairs. Pedagogically they serve to show that agriculture when broadly treated is to be enrolled among the humanities, as well as the sciences, and ethically they point out the vital connection between agricultural science and the welfare of rural people and even of all mankind." (696)

While the terminology of this subject has since varied considerably the general arrangement of courses in rural economics has proceeded on the basis suggested in the report of this committee.

In 1913 the bibliographer of the agricultural college association reported that courses of study in rural economics (often combined with some instruction in rural sociology) had been organized in practically all the agricultural colleges and that outside the colleges interest in these subjects was very widespread. The literature of these subjects available to teachers and students of these subjects had greatly increased. A list of 128 books and other separate publications presented with this

report had been issued between 1906 and 1913. These were classified as follows: "36 under the general subject of rural economics, 11 under land, 11 under agricultural labor, 17 under agricultural cooperation, 13 under agricultural credit and land banks, 9 under farm management, and 30 under rural sociology." A list of 7 periodicals dealing largely with the economic phases of agriculture was submitted, together with a list of 8 other periodicals which had given special attention to the subject at various times within the last few years. The interest manifested by the Department of Agriculture and the state experiment stations was illustrated by an incomplete list showing 60 circulars and bulletins issued by the former, and 52 by the latter since 1906.

Rural Sociology

As the work of the agricultural colleges progressed and they came into closer touch with the farming people, particularly through various forms of extension work, it became apparent that these institutions should deal with the social problems of the rural communities. Many of these problems were inter-related with economic problems. Therefore the courses in rural economics often dealt to a certain extent with social matters. Meanwhile the study of social problems in general was bringing about a more or less specialized body of knowledge which was being formulated and sometimes taught in educational institutions under the title of sociology. It naturally occurred to some students of this new science that one of its divisions should be rural sociology. This was particularly impressed on President K. L. Butterfield, who was teaching rural economics at the Rhode Island College of Agriculture and Mechanic Arts. When he was asked in 1903 to prepare an article for the Office of Experiment Stations on "agricultural economics as a subject of study in the agricultural colleges" he included

"a plea for a broader view of the question and for urging agricultural educators to consider as a unit the whole subject of what, for want of a better term, we may call rural social science, and therefore to permit just as much attention to the study of rural sociology as to the study of agricultural economics. We need more well-equipped leaders on the farm, and these leaders will find that the questions confronting them are in no small degree

sociological. Farmers' organizations, better communication in rural districts, the country school, the country church, all the broad phases of agricultural education, are pressing problems in each farm community. They need the leadership of trained minds. Viewed in all broader aspects, these sociological questions are of the greatest importance." (538)

Some sociological factors influencing the industry of agriculture are as follows:

- Movements of the farm population
- Improvements in communication in rural districts - trolleys, telephones, mail delivery, roads
- The country church
- The rural school
- Agricultural education
- Farmers' organization and societies
- Cooperation of the factors (538)

Following this up in 1904 at the meeting of the agricultural college association he presented a paper on "The Social Phase of Agricultural Education", in which he urged that "the college shall consciously purpose to stand as sponsor (645) for the whole rural problem." This involved the development of extension work, as well as research and resident teaching, in order to give the college leadership in solving the rural problem. "The social sciences in their relation to the rural problem particularly must receive a consideration commensurate with the importance of the industrial, the political and the social phases of the farm question." Herein was a new field for research and, as regards teaching, "in every agricultural course the social problems of the farmers should have due attention."

In the report of the Office of Experiment Stations for 1904 President Butterfield (564) presented an outline of a course in rural sociology. This was divided into two parts, (1) the rural social status, including movements and social condition of farm population, the social psychology of rural life, and the social aspects of current agricultural questions, e. g., tenant farming, farm labor and machinery, immigration; and (2) social factors in rural progress, including means of communication in rural districts, farmers' organizations, rural education, the rural church and the social ideal for agriculture.

L. H. Bailey was also greatly interested in the social problems of the farmers. In a paper read before the agricultural college association in 1905 he argued that agricultural education should not be severely technical but rather "education for country life".⁽⁶³⁵⁾ "It stands also for all the social and economic relations of the farm to its community. It stands for the discussion of the rural church, the rural school. rural literature, sanitation, good houses, good roads, organization, and all the laws that govern trade in farm products."

The importance of the development of courses in rural economics and sociology was also emphasized, as previously stated, in the report of the Country Life Commission in 1908.

Courses in rural sociology were offered in a number of the agricultural colleges and at the Massachusetts Agricultural College a professorship of rural sociology was created in 1906, and in 1911 a division of rural social science was established, which included both economics and sociology.

Agricultural Chemistry

As defined by H. E. Woodward of the United States Bureau of Chemistry in the *Americana*, "agricultural chemistry deals with the chemical composition of plants and animals and with the chemical changes involved in the life processes. It includes the chemistry of the air, water, soil, manures, fertilizers, insecticides, fungicides, plants, animals and metabolism or the chemical changes taking place in living things", as well as the chemistry of milk and other dairy products.

The relations of chemistry to agriculture attracted the attention of scientists almost as soon as that science took a definite form. Reference has already been made to the work of early investigators and writers on subjects within the field of agricultural chemistry. Before the agricultural colleges were established in this country a considerable literature on these subjects had grown up. Such periodicals as Silliman's *American Journal of Science*, begun in 1818, and Edmund Ruffin's *Farmers' Register*, 1833-43, contained articles in this

field. The United States Government entered it in 1833 when it published the investigations of Charles Upham Shepard on sugar cane and the technology of sugar manufacture. The Patent Office reports from 1842 to 1861 contained articles on the chemistry of soils, fertilizers, grains, vegetables, fruits, etc. Attempts were made to adapt information on such subjects to use in education. J. E. Kent's "Fireside Companion or first lessons in chemistry and geology, applied to agriculture", was published in Boston in 1848; David Christie's "Chemistry of Agriculture" and J. A. Nash's "Progressive Farmer" appeared in 1853.

In the early days of agricultural education the province of agricultural chemistry was not clearly defined. This was pointed out by Prof. Samuel William Johnson (1830-1909) of Connecticut, in an article on agricultural science in the Country Gentleman of 1856. "Hitherto teachers and authors, have usually classed together under the designation agricultural chemistry the whole subject of agriculture as connected with science, both theory and practice. * * * But agricultural chemistry is only a part, although indeed the larger part of this subject. Vegetable and animal physiology figure quite extensively in it i. e., in agricultural science." Thus at Yale College Professor Norton, a chemist, was first appointed in 1846 as professor of agriculture but his title was soon changed to professor of agricultural chemistry. However, in 1850 his book was named "Elements of Scientific Agriculture." Professor Johnson had a somewhat similar experience. He was primarily a chemist but taught agricultural science somewhat broadly and entitled his books, which were essentially treatises on agricultural chemistry, "How Crops Grow" (1868) and "How Crops Feed" (1870). In the same way Professor F. H. Storer of the Bussey Institution published "Agriculture in some of its relations with chemistry" in 1887. This book had a broad influence on the teaching of agriculture in the colleges for many years. It was enlarged as the science of agriculture developed and reached a seventh edition in three volumes in 1897.

Francis Humphreys Storer (1832-1914) was born in Boston and graduated at Harvard Scientific School in 1855, after which he studied at Heidelberg under Bunsen, at the Royal Academy of Agriculture at Tharandt, and at Paris under Boussingault. In 1865 he became professor of general and industrial chemistry in the Massachusetts Institute of Technology where in conjunction with Charles W. Eliot he did much to develop methods of teaching chemistry and this resulted in the publication of their "Manual of Inorganic Chemistry" in 1869. In 1870 he was appointed professor of agricultural chemistry in Harvard University. The following year he was made dean of the newly established Bussey Institution and occupied this position for 36 years. Bulletins of this institution recording his investigations were begun in 1874.

Agricultural chemistry as a distinct branch of chemistry was only beginning to be recognized in this country when S. W. Johnson undertook his experimental work in the laboratory of the Yale Scientific School in 1855. In a course of lectures on agricultural chemistry at the Smithsonian Institution in 1859 he treated these subjects: (1) The composition and structure of the plant, (2) the atmosphere and water in their relations to vegetable life, (3) the soil as related to agricultural production, and (4) improvement of the soil by tillage, drainage, amendments and fertilizers. He said that there ought to be a chapter on manures but this was "as yet unwritten." (147) In later years going extensively into problems connected with the composition, valuation and use of fertilizers he laid the foundation for the agricultural experiment stations, which at the outset were very largely concerned with problems in agricultural chemistry, particularly the analysis of fertilizers, soils and plants.

Professor Johnson (1830-1909) was born at Kingsboro, New York, and studied chemistry, physics and botany at the academy at Lowville after which he taught these subjects at the institute at Flushing, Long Island. (150) Then he went to the

school of

applied chemistry at Yale College where he came under the influence of Professor Norton. Afterwards he went abroad and studied at the universities at Leipsic and Munich, partly under Liebig. Returning to New Haven, Conn., he was appointed an assistant in the analytical laboratory at the Yale Scientific School, where he gave special attention to the analysis and valuation of fertilizers and was soon made chemist of the Connecticut Agricultural Society. He also taught agricultural chemistry and in 1875 became professor of theoretical and agricultural chemistry in the Yale School. For many years he was active in teaching and investigating in the field of agricultural chemistry and promoted the establishment of the Connecticut Agricultural Experiment Station, of which he was made director in 1877. He had a broad influence in the movement for agricultural education and research in this country. While the Yale School did not attract large numbers of students because the work done there was too severely technical and advanced for the time, yet a considerable number of men who afterwards became leaders in agricultural education and research were trained there. Among these were Peter Collier, W. O. Atwater, H. P. Armsby and E. H. Jenkins.

At the Michigan Agricultural College, L. R. Fisk, as professor of chemistry, began work in 1858 and the following year a department of agricultural chemistry was established. Professor Fisk was made head of that department in 1861 but when Robert Clark Kedzie (1823-1902) was appointed in 1863 his title was professor of chemistry.

Dr. Kedzie was a graduate of Oberlin College and the medical department of the University of Michigan. He carried a heavy burden of instruction in both general and agricultural chemistry for many years but found time for important investigations relating to wheat, sugar beets, etc. and to act for several years as president of the State Board of Health. Many men afterwards prominent in agricultural education were among his students.

When Cornell University was established a professorship of agricultural chemistry was created and was filled in 1868 by George Chapman Caldwell (1834-1907), a graduate of Lawrence Scientific School of Harvard University, who had also studied at the agricultural college at Cirencester, England, and at the universities of Göttingen and Heidelberg and had taught chemistry at Columbia College in New York, Antioch College in Ohio, and the Pennsylvania State College. During his long service at Cornell he did much to develop both the science and the teaching of agricultural chemistry.

At the Massachusetts Agricultural College Charles Anthony Goessmann (1837-1910) was elected professor of chemistry in 1868. ⁽²⁴⁴⁾ He was a native of Naumburg, Germany, had studied and practiced pharmacy, completed his education and received the Ph. D. degree at the University of Gottingen, where he studied botany, physics, geology and mineralogy and gave special attention to chemistry under Wohler, in whose laboratory he became an assistant. He also lectured on organic chemistry in the University for five years and made important investigations in this field. Coming to America in 1857 he became chemist and general superintendent in a sugar refinery at Philadelphia and then held a similar position in a salt company near Syracuse, New York, and for a time taught chemistry, physics and mineralogy at the Rensselaer Polytechnic Institute at Troy. In the Massachusetts College "for 15 years he gave unaided all the instruction in chemistry and chemical physics, both in the classroom and the laboratory" - and after the establishment of an assistant professorship, continued "to lecture to the senior class on the chemistry of fertilizers, the commercial industries and on organic chemistry". Soon after his appointment he began important experiments on sugar beets and in 1873 secured the passage of the first State law for the control of fertilizers. Continuing experimental work he became one of the managers of the experiment station established at the college in 1878 and director and chemist of the Massachusetts Agricultural Experiment Station established under State law in 1882.

In this position he did much to promote the elaboration and organization of agricultural chemistry, while his work as a teacher had an important influence on the development of instruction in this subject in our agricultural colleges.

In California Eugene Woldemar Hilgard (1833-1916) became professor of agricultural chemistry and director of the agricultural experiment station at the University of California in 1875. He was a native of Zweibrucken in Rhenish Bavaria and studied in universities at Zurich, Freiberg and Heidelberg, receiving the Ph. D. degree at the latter place in 1853. He became chemist of the Smithsonian Institution in 1855 and was State geologist of Mississippi and professor of chemistry at the University of Mississippi between 1858 and 1873 and then professor of geology and natural history at the University of Michigan. In California besides teaching agricultural chemistry he made extensive investigations on the chemistry and physics of soils, with special reference to arid conditions and the reclamation of alkali lands. He also conducted an investigation of the soils of the cotton-growing States in connection with work on the tenth census and made broad studies of the agricultural practices and possibilities of the regions of the Pacific slope. For many years he was active in promoting agricultural education and research and had much influence on the national movement in these fields.

The United States Department of Agriculture began chemical investigations in 1862 and for a long time gave special attention to sugar producing plants. The investigations of Dr. Peter Collier on sorghum and of Dr. Harvey W. Wiley on sugar-beets were especially important. Wiley's manual on the "Principles and practice of Agricultural Analysis" of soils, fertilizers, insecticides and agricultural products is an extensive work in 3 volumes, the first of which was issued in 1894.

Through the work of the above mentioned investigators and others in this country and abroad a large body of knowledge in the field of agricultural chemistry was accumulated prior to the establishment of the agricultural experiment stations. When a number of States had established agencies for the control of fertilizers

and other agricultural materials an Association of Official Agricultural Chemists was formed in 1880 and gave special attention to analytical problems.

After the passage of the Hatch Act the number of chemical workers at the agricultural colleges rapidly increased. This was also the case in the United States Department of Agriculture and in the State regulatory offices. The agricultural colleges were therefore led to specialize their teaching work in chemistry, by creating departments of agricultural chemistry and by offering a considerable number of special courses for the training of analysts and investigators in different branches of this subject, as well as by broadening the chemical instruction given in connection with the general agricultural courses. While much instruction was given through lectures, a considerable number of special text-books and manuals were published and used and a great variety of apparatus for special purposes was developed.

Special buildings for the departments of agricultural chemistry were erected at some colleges and at others well equipped laboratories of different kinds were constructed in other college buildings. Structures for pet experiments and other purposes were sometimes built. The amount and variety of required or optional laboratory work for students, especially in advanced courses, constantly increased. Graduate courses were offered at many colleges.

In a paper on the teaching of chemistry in American Agricultural Colleges, by Professor W. A. Withers of the North Carolina College, in 1910, it was stated that for students in the general agricultural course instruction in chemistry began in freshman year in 32 colleges and in sophomore year in 16 colleges and included training in qualitative analysis in 40 States and in quantitative analysis in 16 States. Agricultural chemistry was taught to agricultural students in connection with general chemistry or in specialized courses in quantitative analysis and plant and animal nutrition. The required course in chemistry for such students covered one year but in 6 colleges it continued during a second year. There were,

however, many elective courses for advanced students which were chosen under a group system.

Originally the professor of chemistry or agricultural chemistry in the agricultural colleges gave most or all of the scientific instruction related to agriculture but when agriculture itself as a science had been systematized and subdivided and men had been trained to teach its several branches much chemical instruction was included in the courses given by teachers of agronomy, soils, animal husbandry, dairying, etc. Professor Withers stated that in 1910 probably for this reason in 17 States agricultural chemistry as such as either not taught to agricultural students or not required of them. To a considerable extent since that time teachers of agricultural chemistry have restricted their work to the preparation of analysts or other specialists.

Meanwhile chemists have been employed as teachers and investigators in the departments of agronomy, soils, dairying, animal husbandry, etc. in a number of the agricultural colleges.

Entomology

The foundations for instruction on insects related to agriculture were laid before the establishment of the agricultural colleges. In 1831 Dr. Thaddeus William Harris prepared a catalogue of insects for Hitchcock's Report on the Geology of Massachusetts and in 1841 made a report on insects injurious to vegetation. In 1854 Dr. Ebenezer Emmons, State Geologist of New York, with the aid of Dr. Asa Fitch, published a volume on insects injurious to vegetation in the "Natural History of New York." That year Dr. Fitch was appointed Entomologist for the New York State Agricultural Society under a State appropriation of \$1,000 and continued to make reports until 1871.

The United States Commissioner of Patents appointed Townsend Glover in 1854 to collect statistics and other information on seeds, fruits and insects. He resigned in 1859 but came back in 1863 as entomologist of the Department of

Agriculture and served until 1877. He was succeeded by C. V. Riley (1843-1895), who had been State entomologist in Missouri from 1868. From 1878 to 1881 Riley was chief of the United States Entomological Commission, with A. S. Packard and Cyrus Thomas, and then at the head of the Entomological Division of the United States Department of Agriculture until June, 1894. In Illinois Messrs. Walsh, LeBaron and Thomas were successively State entomologists from 1868 and then S. A. Forbes took this position in 1882.

Alpheus Spring Packard Jr. (1839-1905), a graduate of Bowdoin College and the Maine Medical School, and a student and assistant under Agassiz in the Lawrence Scientific School and afterwards director of the Peabody Academy of Science at Salem, Mass., and professor of zoology and geology at Brown University, was Entomologist on the Maine Geological Survey in 1861, State Entomologist of Massachusetts 1871-73 and lecturer on entomology at the Massachusetts Agricultural College beginning with 1869, when his book entitled "Guide to the Study of Insects" was first published.

The first professor of entomology in the United States was Dr. H. A. Hagen who began his service in 1873 in connection with the museum of comparative zoology at Harvard University.

John Henry Comstock (1849 -), was educated at Cornell University where he became instructor, assistant professor and in 1882 professor of entomology and invertebrate zoology. From 1878 to 1881 he was entomologist of the United States Department of Agriculture. With his wife, Anna Botsford Comstock, he made important contributions to economic entomology and in 1894 published a "Manual for the Study of Insects."

The entomologists who have been mentioned, with their associates and other workers, built up a large body of knowledge regarding the morphology, classification, life history and food habits of insects, beneficial or injurious to agriculture, and discovered or successfully applied many devices and means for controlling them. The largest amount of work was developed by the United States Department of

Agriculture under the leadership of Riley, but there were important centers of original investigations in some States and particularly New York, Massachusetts and Illinois. These three States took the lead in teaching economic entomology and preparing students to teach this subject or to become investigators. In a number of agricultural colleges in other States there was some teaching of entomology, usually in connection with zoology, botany or horticulture, prior to the establishment of the agricultural experiment stations.

The Hatch Act enabled the State Experiment Stations to greatly increase their entomological work and the employment of entomologists at the stations led to the employment of these men in many cases for part of their time to teach entomology in the agricultural colleges.

In 1889 the American Association of Economic Entomologists was formed. Their proceedings were published by the United States Department of Agriculture, partly in the journal of the Division of Entomology, entitled "Insect Life" and in bulletins of this division (1888-1895) and then in the Journal of Economic Entomology, established in 1908.

A "permanent committee" on entomology was formed in the association of agricultural colleges in 1889 and out of this was developed a section on entomology in 1890, which continued to hold annual meetings until 1903. Its proceedings were published with those of the association. At the meetings of both these organizations there were from time to time presentations of the organization of the entomological work of the colleges and stations and of the methods of teaching entomology.

In 1888 entomology was a separate branch of instruction in only three colleges but there were 25 men doing entomological work in 20 experiment stations. Two years later there were 35 entomologists in 28 States. By 1892 entomological work was developing strongly at the colleges in Colorado, Illinois, Iowa, Kansas, Massachusetts, New Jersey, New York and Ohio and in 1898 there were courses in entomology in every section of the United States. Five colleges were offering graduate courses.

In 1894 the experiment stations in 42 States and Territories employed 28 entomologists and 49 other persons doing entomological work in connection with zoology, botany, horticulture, etc. One person was specially devoted to bee culture. The openings for persons trained in entomology were greatly and rapidly increased in number by the growing work of the United States Department of Agriculture, the State stations and inspection services, and the teaching of nature study in public and private schools.

In 1912 there were 101 entomologists on the station staffs and not less than 112 persons were engaged in entomological work in the agricultural colleges and State universities. That year there were 215 technically trained entomologists in the Bureau of Entomology, as compared with 16 employees in 1894. The Federal and State funds devoted to instruction, research and inspection work in 1912 aggregated about \$1,600,000.

In 1900 the students of entomology in the University of California numbered 250, most of whom were preparing to teach nature-study. At that time all the agricultural colleges for white students, except those in Wyoming and Arizona, had distinct courses in entomology. In the smaller colleges a practical course in economic entomology covering from one to three terms, was given with lectures and laboratory work and often there was some opportunity for students specially interested in this subject to take advanced work. In some larger colleges and universities there were courses largely elective and covering 2, 3 or 4 years. At Cornell University in 1911 there were six men teaching different branches of entomology and 29 courses were offered. Degrees of B.S., M.S. and Ph. D. were given students whose major study was entomology. At the Massachusetts Agricultural College Charles Henry Fernald, who had come there as professor of zoology, gave special attention to entomology and his early work in the campaign against the gypsy moth attracted wide attention. This and the establishment of the experiment stations caused the entomological work to develop rapidly. In 1893 a course

leading to the M.S. degree was organized and in 1898 work leading to the Ph. D. was offered. A separate professorship of entomology was established in 1899. In 1914 in the Bureau of Entomology the largest number of technically trained men came from the Massachusetts Agricultural College and Cornell University, and out of 306 entomological workers in the agricultural colleges and experiment stations in 1915, 68 had studied at Cornell University, 33 at Ohio State University, 27 at Massachusetts Agricultural College, 15 at the University of Illinois, and 12 at the Michigan Agricultural College. Of those from Cornell 11 had the M.S. degree and 14 Ph. D.; from Massachusetts 4 had the M.D. degree and 7 Ph. D.

Instruction was given in the colleges generally through lectures and laboratory work. Packard's and Comstock's Manuals were quite generally used, and there were also several other American text-books on entomology issued during this period. The entomological publications of the Department of Agriculture and the experiment stations became very numerous. Collections of insects grew rapidly and at some colleges were extensive. Spraying machinery and other devices for controlling insects became common at the colleges. In 1838 the first house for breeding and rearing insects, commonly called an insectary, was built at Cornell University. By 1901 such houses existed in at least 12 States. Field practice was more and more required, especially with advanced students. Opportunities for such work became numerous in connection with the experiment stations, Bureau of Entomology or State inspection services.

Veterinary Medicine

The first veterinary school was established at Lyons, France, in 1762 and this was soon followed by similar schools in other European countries. In Great Britain the first school was in London and then came schools at Edinburgh and Glasgow. On the Continent grants of public funds were made to such schools but in Great Britain they were strictly private institutions.

In 1807 Dr. Benjamin Rush lectured before the Philadelphia Agricultural Society on diseases of animals and advocated teaching of veterinary science at the University of Pennsylvania.

Peter Aswell Browne published in 1837 at Philadelphia an essay in which he gave an account of the veterinary schools in France and England and exhibited "the facility and utility of constituting similar schools in the United States", (450) and in 1854 James Bryan made a plea for the establishment of such schools before the Pennsylvania State Agricultural Society. (452) A charter for a veterinary school had been granted by the Pennsylvania legislature and a subscription of \$40,000 had been made to organize the school in Philadelphia. It was opened in 1853 but got no students until 1859 when there were two, one of whom was a graduate of the Boston Veterinary Institute chartered in 1855. The Boston school came from the efforts of G. H. Dadd, a veterinary practitioner, who had started the American Veterinary Journal in 1851. The faculty consisted of Dadd as professor of anatomy and physiology, C. M. Wood of the theory and practice of medicine and surgery, R. Wood of practice on cattle and A. D. Copeman of chemistry and pharmacy. The Philadelphia and Boston schools had only short lives. In 1858 a veterinary medical association was formed at Boston, with Wood as president. About that time an outbreak of pleuro-pneumonia in cattle was attracting public attention and E. F. Thayer of Boston was appointed Commissioner to investigate that disease.

The New York College of Veterinary Surgeons obtained a charter in 1857 but was unable to operate until 1864. In 1875 the American Veterinary College was opened in New York City and first gave the degree of Doctor of Veterinary Surgery to six students in 1878. These two colleges operated as proprietary institutions until 1899 when they were consolidated under the New York University. In 1863 the United States (now American) Veterinary Medical Association was organized.

The St. Louis Veterinary College was incorporated in 1875. Schools on a private foundation were also formed in Chicago, Kansas City, Cincinnati, Baltimore, Washington, Detroit and other cities with short courses representing two years of five or six months each.

"The necessity for a fuller, graded course based on matriculation requirements which would be a guaranty of fitness to pursue such a course profitably, was first voiced by schools connected with state colleges and universities." In 1868 Illinois Industrial University (now University of Illinois) established a professorship of veterinary science and appointed to this position, F. W. Prentice, a graduate of the London Veterinary College. At first it was not intended to give a full veterinary education but instruction in this subject was part of an agricultural course covering four years. The principal lectures were on entomology, physiology and general veterinary science. For clinics sick animals were brought in from the neighborhood and treated free of charge.

Cornell University also established a chair of veterinary medicine in 1868 and brought into this position James Law. He, too, was a graduate of the London Veterinary College and was already author of a work on Anatomy of Domestic Animals. He soon became a veterinary editor of the New York Weekly Tribune and consulting veterinary surgeon to the State Agricultural Society. Excitement caused by the appearance of Texas fever among cattle about this time strengthened public interest in his work. A four year course leading to the degree of Bachelor of Veterinary Science was established, of which the last two years were devoted to veterinary studies. Teachers in the agricultural department of the university gave instruction in anatomy, physiology, histology, zootechny, hygiene, botany, toxicology, pharmacy and therapeutics and Professor Law taught principles and practice, surgery, obstetrics, surgical pathology and anatomy, examination of soundness and principles of shoeing. To receive the degree of Doctor of Veterinary Medicine the student was obliged to pursue two additional years of graduate study.

For a number of years most of the students of veterinary courses took these as a part of their work for the degree of bachelor of agriculture. At the end of nine years only two students had been given veterinary degrees. In 1894 the veterinary department was made the New York State Veterinary College with a separate building and faculty.

Veterinary departments were established at the Iowa State College in 1879, Ohio State University in 1884 (became College of Veterinary Medicine in 1895), the University of Minnesota in 1890, and the University of California in 1895. By 1877 lecture courses in veterinary science were given as part of the agricultural course in land-grant colleges in Massachusetts, Maryland, New Hampshire, Pennsylvania, and Vermont. At the Michigan Agricultural College lectures on this subject were begun in 1881, but a department of veterinary medicine with authority to grant the degree of Doctor of Veterinary Medicine was not provided until 1907 and this was put into operation as a division of the college in 1910.

At the Kansas Agricultural College a veterinary department was organized in 1872 but was discontinued in 1874 "for want of means and room" and was not revived until 1888.

At the Massachusetts Agricultural College lectures on diseases of domestic animals were begun in 1869 but a professorship of veterinary science was not established until 1890. A separate veterinary building and stable hospital were erected in 1898.

At the Washington Agricultural College a School of Veterinary Science was established in 1896.

In the United States Department of Agriculture the first appropriation for the investigation of diseases of animals was made in 1878 and the Bureau of Animal Industry was established in 1884, with Dr. D. E. Salmon, a graduate of the veterinary department of Cornell University, as chief. This bureau developed quite rapidly.

By 1900 there were also veterinary inspectors in the larger cities and State veterinarians in a number of States. The passage of the Hatch Act in 1887 brought about an increase of veterinarians in the experiment stations. In 1899 there were 32 veterinarians, most of whom had professional degrees, at the agricultural colleges and experiment stations. That year there were 17 veterinary schools in 12 States, as compared with six schools in 1888. These schools had 249 instructors, of whom 156 had the rank of professor. Sixteen had authority to grant degrees. Only six were separate institutions. In 1898 there were 123 graduates.

In response to growing demands that professional standards should be created "the United States Veterinary Medical Association adopted in 1891 an article providing that all applicants for membership should be graduates of recognized veterinary schools with curricula of at least three years of six months each and corps of instructors comprising at least four veterinarians. The next step in advance came in 1895 when the New York legislature enacted that at least a high school diploma representing four years of high school work should be offered for admission to a veterinary school, that the veterinary curriculum should embrace three full years and that only those who had met both requirements could be admitted to the regents veterinary examinations for license to practice in the State."

By 1908 the Bureau of Animal Industry was employing over 800 veterinarians. It was therefore vitally interested in the professional training of its employees. Its action in this matter has been described in the history of the bureau by Dr. U. G. Houck, as follows:

"As the work of the Bureau increased and became more exacting, and the problems dealing with animal plagues became more intricate, increased efforts were made by the Department of Agriculture to procure the best-trained veterinarians available. The scope of the examination was broadened and the questions were made somewhat more comprehensive in order to eliminate those applicants whose limited veterinary education and training did not qualify them to perform efficiently the responsible duties that would be required of them in the Bureau. There were a number of veterinary schools in the United States at this time which were not equipped to give thorough instruction in veterinary subjects. The faculties were not complete, and in some instances

not competent; the courses of study were too short. As a consequence the graduates of some schools were not up to the standard desired for Bureau work. Veterinary education generally in the United States was progressing, but some schools were lagging.

In order to obtain men thoroughly qualified by education to fill positions in the Bureau, it was deemed advisable to prescribe a standard of veterinary education for schools that desired to prepare their graduates to qualify to take the civil-service examination for positions in the Bureau. The Civil Service Commission approved this arrangement, and in February, 1908, the Secretary of Agriculture appointed a committee consisting of five leading veterinarians of the country for the purpose of obtaining information regarding the courses of instruction then given at the various veterinary colleges, and to make recommendations as to lengthening and arranging the courses of instruction properly to qualify graduates of these colleges for positions in the Bureau. The members of this committee were Dr. Richard P. Lyman, Secretary of the American Veterinary Medical Association; Dr. Joseph Hughes, President of the Chicago Veterinary College; Dr. Tait Butler, Secretary of the Association of Veterinary Faculties and Examining Boards of North America and State Veterinarian of North Carolina; Dr. Paul Fischer, State Veterinarian of Ohio; and Dr. A. M. Farrington, then Assistant Chief of the Bureau.

The committee met in Chicago February 27, 1908, and organized with Dr. Lyman as chairman and Dr. Farrington as secretary. At this meeting a definite plan was formulated for visiting the colleges and obtaining the desired information, and on February 28 the committee commenced its investigations. The veterinary colleges of the United States and one in Canada, comprising in all seven State institutions and fourteen private schools, were visited. On April 20, 1908, the committee met in Washington and submitted to the Secretary of Agriculture its report, which specified the minimum course of instruction which the committee considered necessary to qualify graduates to become eligible for the position of veterinary inspector. The report embodied also recommendations as to faculties, equipment and teaching. This report and recommendation were published in Bureau Circular 133, dated July 6, 1908, and sent to the veterinary colleges in the United States and Canada. In September of the same year these recommendations were approved by the American Veterinary Medical Association." (558)

The minimum requirements for matriculation and the college course in veterinary medicine were fixed as follows: The matriculation examination shall include spelling, arithmetic, letter writing, penmanship, copying from plain copy, United States history and geography of the United States and its possessions, with a passing grade of not less than 70 per cent. (This has since been modified to include at least four years' high school education, of at least 14 full units or their equivalent.)

The course of instruction shall cover three years of not less than six months each, with a minimum of 150 days of actual teaching in each year and a minimum of 3,200 hours for the three years. (Since changed to four years of not less than 6½ months and 3,380 hours of actual teaching.)

The subjects and hours in the course were outlined as follows:

Anatomy, major subject:

Lectures -----	200	
Laboratory -----	<u>300</u>	
Total -----		500

Histology:

Lectures -----	40	
Laboratory -----	<u>100</u>	
Total -----		140

Embryology:

Lectures -----	10	
Laboratory -----	<u>20</u>	
Total -----		30

Zoology:

Lectures -----	20	
Laboratory -----	<u>20</u>	
Total -----		<u>40</u>
Total for subject -----		710

Physiology, major subject:

Lectures -----	80	
Laboratory -----	<u>20</u>	
Total -----		100

Principles of nutrition -----	10	
Hygiene -----	10	
Animal locomotion -----	<u>5</u>	
Total -----		<u>25</u>
Total for subject -----		125

Zootechnics, major subject:

Breeds and breeding -----	30	
Judging -----	30	
Feeds and feeding -----	30	
Dairy inspection -----	10	
Jurisprudence -----	<u>10</u>	
Total for subject -----		110

Chemistry, major subject:

Lectures -----	50	
Laboratory -----	<u>150</u>	
Total -----		200

Physics (elementary) -----		20
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Physiological chemistry -

Urine analysis -----	10	
Milk analysis -----	<u>10</u>	
Total -----		<u>20</u>

Total for subject -----		240
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Materia Medica, major subject:

Lectures -----		70
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Pharmacology, lectures and laboratory -----		50
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Botany -----		30
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Toxicology -----		<u>10</u>
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Total for subject -----		160
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Pathology, major subject:

Lectures -----	40	
Laboratory -----	<u>100</u>	
Total -----		140

Bacteriology:

Lectures -----	20	
Laboratory -----	<u>90</u>	
Total -----		110

Parasitology --

Lectures -----	50	
Laboratory -----	<u>10</u>	
Total -----		60

Post-mortem examination ----- 10

Meat inspection ----- 50

Laboratory diagnosis ----- 50

Total for subject ----- 420

Practice of Comparative Medicine, major subject:

Lectures ----- 250

Diagnostic methods and clinics ----- 400

Therapeutics ----- 100

Control of infective diseases ----- 25

Total for subject ----- 775

Surgery, major subject:

Lectures ----- 100

Surgical exercises ----- 80

Total ----- 180

Surgical diagnosis and clinics ----- 300

Surgical restraint ----- 30

Soundness ----- 20

Lameness ----- 50

Shoeing and balancing ----- 10

Dentistry (lectures) ----- 20

Obstetrics ----- 50

Total for subject ----- 660

The faculty shall contain at least five qualified veterinarians, each with three years experience in teaching or practicing veterinary science subsequent to their graduation at a veterinary college and not more than three of them shall be graduates of any one veterinary college. These veterinarians are to teach anatomy, pathology, practice of comparative medicine, surgery, and materia medica or physiology.

"On January 21, 1909, the Chief of the Bureau invited the representatives of the various veterinary colleges to Washington to discuss with Department officials the report of the committee, including the recommendations. The following institutions were represented at the conference:

Chicago Veterinary College
 Colorado State College
 Indiana Veterinary College
 Kansas City Veterinary College
 New York State College
 Ohio State University
 San Francisco Veterinary College
 Grand Rapids Veterinary College
 McPhillip Veterinary College
 University of Pennsylvania Veterinary Department
 Cincinnati Veterinary College
 United States College of Veterinary Surgeons

"After a two days' conference and a full discussion of the problems, the recommendations made by the committee were approved by the officials of the colleges represented at the conference.

In March, 1909, there was appointed within the Bureau a committee of veterinary education consisting of Dr. R. W. Hickman and Dr. A. M. Farrington. Commencing March 17 of that year, this committee visited the principal veterinary colleges in the United States and Canada. The work of the committee consisted of examining matriculation papers and credentials, making inquiry concerning the subjects studied, number of hours devoted to each, and inspecting the facilities and equipment for teaching and for laboratory work. All possible information was obtained regarding the manner in which each college was complying with the provisions of Circular 133, and delinquencies were brought to the attention of the proper college officials. Generally the veterinary colleges cooperated willingly with the Bureau, and they deserve much credit for the splendid spirit displayed and the effective manner in which they met the Bureau's requirements.

Private schools predominated in number up to the year 1918, when there were 23 schools in the United States which gave full courses in veterinary medicine. Twelve of these schools were private institutions and eleven were connected with State colleges or received State aid. There were also two State agricultural colleges which gave two-year courses on veterinary subjects. As the private schools were sustained entirely by tuition fees, there was keen rivalry among them, and this, in some instances, led to a laxity in accepting matriculants. Usually the private schools did not maintain such high standards of veterinary education as the colleges which received State aid. At present (July 1, 1923) there are only three private veterinary schools in the United States and it may be expected that eventually they will cease to exist, as it is difficult for a private veterinary school to maintain the required standard and compete with colleges that receive financial aid from the States. (558)

Following are the names of the veterinary colleges in the United States ~~and foreign countries~~ which were on the accredited list July 1, 1923;

Alabama Polytechnic Institute, College of Veterinary Medicine,
Auburn, Ala.
Colorado State College, Division of Veterinary Medicine, Fort
Collins, Colo.
Georgia State College of Agriculture, Veterinary Division,
Athens, Ga.
Indiana Veterinary College, Indianapolis, Ind.
Iowa State College, Division of Veterinary Medicine, Ames, Iowa.
Kansas State Agricultural College, Veterinary Department,
Manhattan, Kansas.
Michigan Agricultural College, Division of Veterinary Science,
East Lansing, Mich.
New York State Veterinary College, Cornell University, Ithaca, N. Y.
Ohio State University, College of Veterinary Medicine, Columbus, Ohio.
St. Joseph Veterinary College, St. Joseph, Mo.
State College of Washington, Veterinary Department, Pullman, Wash.
Texas Agricultural and Mechanical College, School of Veterinary
Medicine, College Station, Texas.
United States College of Veterinary Surgeons, Washington, D. C.
University of Pennsylvania, School of Veterinary Medicine,
Philadelphia, Pa."

Home Economics

The land-grant colleges and universities have had so prominent a part in developing collegiate instruction and extension work in home economics and these features of their educational program have been in so many cases intimately associated with their agricultural departments that it seems appropriate and desirable to include in this history of agricultural education a brief account of the origin and development of the courses in home economics in these institutions.

In the American colonies before the Revolution needlework was taught in the dame schools transplanted from England and the girls in charity schools engaged in housework. The education of girls generally was much neglected until the latter part of the eighteenth century when they were admitted to elementary schools for part of the day and gradually to full participation of such education as these schools afforded along with the boys. When academies were organized in the early part of the nineteenth century some were for girls and others were coeducational. The first high school for girls was begun at Worcester, Mass. in 1826.

As the academies and then the high schools spread westward they more and more became coeducational. In 1833 the Oberlin Collegiate Institute, afterwards Oberlin College, opened its doors to women. When schools of various grades increased in number rapidly teachers were in great demand and women were increasingly admitted to this profession. As early as 1816 Mrs. Emma Hart Willard (1787-1870), who had opened a boarding school for girls at Middlebury, Vt., in 1814, saw the necessity for higher education of women, with special reference to the preparation of teachers, and drew up "a plan for improving female education." She submitted this plan to Governor Clinton of New York, who received it with favor. This was in 1818, the very year in which he also recommended the establishment of an agricultural school. The legislature adopted his suggestion for a higher school for girls, chartered it at Waterford and gave it a share of the State literature fund. Mrs. Willard removed her school from Middlebury to Waterford but the regents of the State university decided on technical grounds that she was not entitled to any part of the literary fund and an appeal to the legislature was unsuccessful. The school was removed to Troy in 1821 where it was very successful as a private institution. Mrs. Willard gave up its management to her son in 1839 and it has continued to the present day, being known as the Emma Willard School.

While Mrs. Willard was in charge it educated over 200 teachers and had much general influence on the development of better schools for girls. Her original plan for this school included "domestic instruction". Her reasons for this were explained as follows:

"It is believed that housewifery might be greatly improved by being taught, not only in practice, but in theory. There are right ways of performing its various operations; and there are reasons why those ways are right; and why may not rules be formed, their reasons collected, and the whole be digested into a system to guide the learner's practice?"

After the establishment of Rensselaer Institute (see p. 186) Amos Eaton gave some instruction in natural science privately to students attending the Willard Seminary. Among his students at the institute in 1824-25 was Mary Lyon, who also attended his lectures at Northampton, Mass., and lived for a time in his home in Troy.

It remained for another leader in the education of girls to do what is suggested in Mrs. Willard's question and thus to make possible the introduction of the teaching of domestic science into schools and colleges. Miss Catherine Beecher (1800-1878), daughter of Rev. Dr. Lyman Beecher and sister of Henry Ward Beecher and Harriet Beecher Stowe, opened a school for girls at Hartford, Connecticut, in 1822 and went to Cincinnati, Ohio, in 1832, where she had a school with her sister Harriet. In 1835 in an essay on "The Education of Female Teachers" she urged that household arts should be taught in schools for girls. She supplied the necessary material for such instruction by publishing in 1841 an excellent text-book, entitled "A Treatise on Domestic Economy." This book contained chapters on healthful food, clothing, cleanliness, domestic manners, care of infants, construction of houses, and miscellaneous directions, including care of a cow, smoky chimneys, comfort of guests, etc. Her estimate of the importance of teaching this subject is shown in the preface, in which after pointing out "the deplorable sufferings of multitudes of young wives and mothers from the combined influence of poor health, poor domestics and a defective domestic education", she argues that

"The measure which, more than any other, would tend to remedy this evil, would be to place domestic economy on an equality with the other sciences in female schools. This should be done because it can be properly and systematically taught (not practically, but as a science), as much so as political economy or moral science, or any other branch of study; because it embraces knowledge, which will be needed by young women at all times and in all places; because this science can never be properly taught until it is made a branch of study; and because this method will secure a dignity and importance in the estimation of young girls, which can never be accorded while they perceive their teachers and parents practically attaching more value to every other department of science than this. When young ladies are taught the construction of their own bodies, and all the causes in domestic life which tend to weaken the constitution; when they are taught rightly to appreciate and learn the most convenient and economical modes of performing all family duties, and of employing time and money; and when they perceive the true estimate accorded to these things by teachers and friends, the grand cause of this evil will be removed." (13)

Miss Beecher's book was a success. It was used as a text-book in schools, was added to the Massachusetts district school library, and passed through a number of editions. It was followed by a Domestic Receipt Book and as late as 1869-1873 by The American Woman's Home, or Principles of Domestic Science, New Housekeeper's Manual, etc., in which her sister joined.

1370

In 1852 Miss Catherine Beecher organized the American Woman's Educational Association "to aid in securing to American women a liberal education, honorable position and remunerative employment in their appropriate profession; the distinctive profession of women being considered as embracing the training of the human mind, the care of the human body in infancy and sickness and the conservation of the family state." This association lasted about 20 years. The career of this remarkable woman is summed up by Dr. Andrews of Teachers College of Columbia University as follows:

"Her life work as educator, author of text-books, and leader in social movements - for women as teachers, for the higher education of women, for moderation in the anti-slavery crusade, for hygienic and health reforms, for attention to domestic economy, and finally against the suffrage for women - made her a national figure from 1830 until her death, in 1878." (322)

Meanwhile Mary Lyon (1797-1849) had established Mt. Holyoke Seminary (now College) at South Hadley, Mass., in 1837. She was apparently influenced by the movement for manual labor schools and caused her students to undertake the labor involved in doing the domestic work necessary in a boarding school, for physical exercise, reduction of school expenses and moral discipline. They thus had much practical training in housekeeping. The Wesleyan Female College in Georgia was opened in 1839, and the Greensboro Female College in North Carolina in 1846. The State University of Utah admitted women in 1850, followed by Iowa in 1856, Washington in 1860, Kansas in 1868, Minnesota and Indiana in 1868, Michigan, Illinois, California and Missouri in 1870, Nebraska in 1871, and Wisconsin in 1874. In Ohio the Act of March 22, 1870, establishing the Agricultural and Mechanical College (now Ohio State University) provided that the college should be "open to all persons over 14 years." Vassar College, the first well endowed institution of strictly college grade for women, was opened in 1865. Its founder in his letter of directions included domestic economy in the program of studies but the faculty did not carry this out.

Sewing was introduced in primary public schools in Boston in 1821 but it was not until 1876 that the Massachusetts legislature authorized local school committees to teach sewing. About this time the teaching of sewing and cooking was begun in several cities under private auspices as a philanthropic effort, especially in connection with "the kitchen garden movement." From about 1880 and as a part of the wider ^{manual} training movement the teaching of household arts, cooking and sewing, began to be more widely taught in elementary schools and in city high schools. This led to courses for teachers of household arts in the normal schools. The Industrial Education Association which took the place of the Kitchen Garden Association in 1884 recognized household arts as a part of the manual training movement. This association established in 1888 the New York College for Training Teachers, now Teachers College of Columbia University. This college, Pratt Institute in Brooklyn established in 1887 and Drexel Institute in Philadelphia in 1891, together with the Kansas ^{Agricultural} ~~Land-Grant~~ College, were the principal early sources of trained teachers of household arts for public schools.

Even before the passage of the land-grant act of 1862 some of the friends of higher education in agriculture and other industries desired that women as well as men should have the opportunity to study in such institutions and favored making them coeducational. This was impressed on the leaders of the movement for the People's College in New York by certain prominent women. It was also favored in the North Central States, where coeducation in the secondary schools was well-nigh universal. As the land-grant colleges were organized the admission of women was sought. This began in Kansas in 1863, Minnesota in 1868, Iowa in 1869, Illinois and Michigan in 1870, Nebraska in 1871 and New York in 1872.

As soon as the Iowa State College was opened to students, March 17, 1869,

"the matron in connection with her work as steward of the boarding department, adopted the so-called Mount Holyoke plan, requiring each young woman to work for two hours per day, under careful supervision, in the dining-room, kitchen or pantry."

In 1872 a course of lectures on housekeeping was given to the junior girls and in 1877 a course of cooking was added, with a kitchen specially furnished for the class. Two years later sewing and laundry work were introduced and the lectures were broadened to include house furnishing, care of children and the sick, management of help, dress, etc. Physiology and domestic chemistry were also taught. By 1883 the "department of cookery and household arts" had larger rooms and lessons were given to freshmen, sophomores and juniors but the work was chiefly confined to the theory of food and nutrition with "practice in both plain and ornamental cookery."

At the Kansas Agricultural College sewing was first taught in 1873 and two years later a course of lectures was given by the professor of chemistry on "bread, its composition, changes in baking; meat, changes in cooking; vegetables, composition and food value, etc." There were also lectures on dairy products by the professor of agriculture and lectures and lessons on cooking by the sewing teacher.

In 1882 Mrs. Nellie Sawyer Kedzie, a graduate of this college in 1876, was employed to teach household economy and in 1887 was made professor of household economy, a position she held for 10 years. Afterwards she taught in the Bradley Polytechnic Institute in Peoria, Illinois, and in 1901 was married to Professor Howard M. Jones of Berea College, Kentucky. In recent years she has been connected with the College of Agriculture of the University of Wisconsin, as State Home Demonstration Leader. While in charge of the home economics department at the Kansas Agricultural College she greatly developed and improved the work, especially along the more practical lines, and made that college a strong center for the training of teachers of home economics.

At the Illinois Industrial University (now the University of Illinois) the catalogue of 1871-72 announced a "School of Domestic Science and Art". No work in home economics was done until Miss Lou C. Allen was appointed "instructor

in domestic science" in 1874. She was a graduate of the State Normal School at Bloomington, Illinois, and had been preceptress of the Peoria County Normal School. She spent some time in the East getting special information and instruction and during her first year at the Illinois University devoted much time to preparing a course of study, which was announced in the catalogue for 1875-76. She states that "the purpose was to provide a full course of instruction in the arts of the household and the sciences related thereto." As the first attempt to construct a course in home economics of college grade with a scientific basis this course is worth reproduction here.

Course of Domestic Science

Required for degree of B.S. in school of domestic science

First Year

1. Chemistry; trigonometry; drawing (full term); British authors.
2. Chemistry; designing and drawing; American authors.
3. Chemistry; designing and drawing; rhetoric.

Second Year

1. Botany; physiology; German or English classics.
2. Food and dietetics (simple aliments); botany and greenhouse; German or English classics.
3. Food and dietetics (compound aliments and principles of cooking, etc.); zoology; German or English classics.

Third Year

1. Domestic hygiene; ancient history; German or French.
2. Physics; mediaeval history; German or French.
3. Physics or landscape gardening; modern history; German or French.

Fourth Year

1. Household aesthetics; mental science; history of civilization.
2. Household science; constitutional history; logic.
3. Domestic economy; usages of society, etc.; political economy; home architecture; graduating thesis or oration or essay. (175)

Mill Allen not only taught domestic science and gymnastics but was also virtually what is now called dean of women. She was a thorough teacher and had high ideals for her work. She was sufficiently successful in her work at the university to be advanced to the position of "professor of domestic economy."

She married Dr. John M. Gregory, the first regent of the University of Illinois, and left the university when he retired in 1880. A new professor for this department was not secured until 1900.

In 1890 only four land-grant colleges had departments of home economics, namely those in Kansas, Iowa, Oregon and South Dakota. In the next fifteen years such departments were organized in 18 of these colleges for white students. With the exception of the institutions in Connecticut and Tennessee these colleges were in the North Central and Western States. There was also some elementary instruction in home economics in 11 land-grant institutions for colored students.

During the nineteenth century the general scientific basis for school and college courses in home economics was greatly broadened and there was a considerable amount of research directly within this field. The physicist, Benjamin Thompson (1753-1814), better known as Count Rumford, studied problems of heat, including "the economy of fuels, of kitchen ranges, fire places and heating apparatus, of utensils, of various culinary processes, as baking and making soup and coffee", as well as lighting and ventilation.

Before that domestic heating was also studied by Benjamin Franklin (1760-1790). The Franklin stove remains today as a proof of the value of his work. He studied the problems of heating the home, drafts, flues, ventilation, etc. His interest in the household, however, were not limited to these problems.

Edward L. Youmans (1821-1887), student of chemistry, physics and medicine, founder of the Popular Science Monthly, lecturer on scientific subjects and author of several books, published in 1857 a Handbook of Household Science. In this were brought together in systematic order the contributions of chemistry, physics and biology up to that time which bore upon household problems. This served for many years as a text-book or manual in the schools which undertook teaching in the field of home economics.

Ellen Henrietta (Swallow) Richards (1842-1911), born and brought up on a farm in Dunstable, Massachusetts, studied at Westford Academy and graduated at Vassar College in 1870, where she studied astronomy under Professor Maria Mitchell and chemistry under Professor Farrar who was interested in its practical applications. (62) In 1871 she became the first woman student at the Massachusetts Institute of Technology, taking special studies in industrial chemistry and receiving the degree of bachelor of science in chemistry in 1873. She remained at the institute as a sanitary chemist, studied and taught broadly the chemistry of water, air, food, wall papers, fabrics, application of heat to foods, etc.; published works on air, water and food (1884), The Chemistry of Cooking and Cleaning (1881), Food Materials and their Adulteration (1885), Domestic Economy in Public Education (1889); with Mrs. Mary Hinman Abel organized in 1890 the New England Kitchen at Boston, at which for the first time food was prepared and sold on the basis of its nutritive value; illustrated this at the Chicago Exposition in 1893 through the "Rumford Kitchen"; was prominent in a number of local educational enterprises in Boston and was one of the founders of the Association of Collegiate Alumnae. By the close of the last century she had become a national figure in the cause of the education of women and particularly in the development of home economics education on a scientific foundation. After her marriage in 1875 to Professor Robert H. Richards of the Massachusetts Institute of Technology, she became a housekeeper at Jamaica Plains and thus broadened her knowledge of the practical problems of home economics, as well as their scientific relations, while she continued her work at the institute.

Dr. W. O. Atwater, professor of chemistry at Wesleyan University and the first director of the Office of Experiment Stations, became interested in the problems of human nutrition and the results already obtained by foreign investigators, particularly in Germany. He began investigations on his own account and in 1894, with the aid of Hon. Sterling Morton, then Secretary of Agriculture, obtained a Federal appropriation for nutrition investigations. These were carried

on under his charge as an officer of the Office of Experiment Stations. Besides important original investigations, there was much compilation of information from other sources. Within a few years both scientific and popular bulletins were issued in considerable number and widely distributed. Efforts were also made to get definitions and articles relating to home economics into the encyclopedias and dictionaries. From its close relations with the land-grant colleges and its broad interest in scientific and practical education the Office of Experiment Stations became an important agency in the promotion of higher education in home economics.

The separate agricultural colleges, with their lower entrance requirements and definite vocational aims, early developed comparatively strong departments of home economics on a practical basis, but these were often relatively weak on their scientific side. In the land-grant institutions which were universities the tendency was to minimize the practical work and make the instruction largely theoretical in order to gain for the home economics departments proper recognition as of college grade. There was no uniformity as regards nomenclature or content of the courses offered in the different institutions. This applied not only to the land-grant institutions but to other colleges attempting to teach this subject and in great measure to the normal and secondary schools.

Perceiving the weakness and confusion thus created in the movement for education in home economics Mrs. Richards undertook to create an agency for the study of the problems of definition and organization of such education. Taking advantage of her acquaintance with Mr. Melvil Dewey, State Librarian of New York, and secretary of the Board of Regents of the University of the State of New York, who had invented the decimal classification for library catalogues, and with Mrs. Dewey who was associated with him in the management of the club at Lake Placid, New York, and was thus broadly interested in household matters, Mrs. Richards ventured to suggest to them the calling of a conference on home economics. This she did in connection with a visit to Lake Placid to advise Mr. Dewey with reference to the examination in household science, which in 1896

had been admitted to a place in the program of examinations annually held by the regents of the University of the State of New York. It appealed to them both, but Mr. Dewey had a special interest in the classification of the subject for library purposes. Eleven persons were brought together in September, 1899, by the call for the first conference, which stated that the trustees of the Lake Placid Club believed "that the time was ripe for some united action on the part of those most interested in home science, or household economics." (74) Among the subjects to be considered by the conference were a classification of household economics as a working basis, the founding of State schools or chairs of household economics in State universities, and the training of teachers of domestic science.

Mrs. Richards was made chairman of the conference and Miss Anna Barrows, secretary. Mr. Dewey had put home economics as a useful art under production, the conference put it under the economics of consumption. After considering a number of terms which had been used or suggested as a name for the subject as a whole, the conference adopted home economics. There was much discussion of training for higher leadership in this movement and a committee on courses of study in colleges and universities was appointed. These conferences were continued for 10 years and exerted considerable influence on the systemization of the subject and the improvement of courses of study. A bibliography of over 1,500 works on subjects related to home economics published since 1850 was presented to the conference in 1901 and afterwards issued as Bulletin 52 of the New York State Library. Through this and in other ways the conference did much to promote the literature of home economics. It also encouraged research in this field by the government and universities. The land-grant colleges were not represented at the first meeting but were soon drawn into this movement, as well as the Office of Experiment Stations, which was represented by its director and by Professor Atwater, Dr. C. F. Langworthy and others. The reports of its committee on courses of study attracted much attention and were the basis for much fruitful discussion regarding the content of such

courses. In 1903 the meeting was held at Simmons College, established in Boston the previous year as the first technical college for women. Advantage was then taken of the meeting of the National Education Association occurring at the same time to hold a joint session with its section on Manual Training. The final session of the conference was held at Chautauqua, N. Y., during the great educational meeting annually held there. By this time it had become apparent that the nation-wide interests of the home economics movement called for a permanent organization on a more public basis. A committee was appointed to consider this matter with the result that at a meeting held in Washington, D. C., December 31, 1908-January 2, 1909, the American Home Economics Association was formed and Mrs. Richards was elected president. At this meeting 143 persons attended but about 700 had reported their adherence to the plan for the new organization. In its constitution the object of the association was stated to be "the improvement of living conditions in the home, the institutional household and the community." It undertook the publication of the Journal of Home Economics, which has been successfully developed since that time and contains a great fund of information on the progress of education and research in its field.

Meanwhile the development of departments of home economics in the land-grant colleges and universities had proceeded and the relations between these departments and the agricultural side of these institutions, which had been intimate from the first, became closer and more important. In a number of the universities the department of home economics was organized in the college of agriculture. This closeness of relations was brought about because both branches represented the same type of education, both dealt largely with agricultural products and both depended on the same fundamental sciences for the foundations of their college courses. The agricultural experiment stations were engaged in researches which bore on the problems of home economics. This was particularly true with reference to food and nutrition, bacteriology, entomology, etc. Moreover in agriculture the work and interests of the home are indissolubly connected with those of the farm. Thus the friends of agricultural education had a most powerful incentive for promoting home economics education.

At the very time that the American Association of Home Economics was being formed, the American Association of Agricultural Colleges and Experiment Stations through its committee on instruction in agriculture was preparing a four-year course in home economics, with the aid of a college teacher of that subject. After the Home Economics Association was organized the agricultural committee asked that association to appoint a committee to join in this work. Such a committee consisting of representatives of the home economics departments in land-grant institutions was appointed in 1910 and the two committees agreed on a report which was submitted to their respective associations at their next annual meetings. The substance of that report is as follows:

"The college courses of study especially arranged for women will naturally include branches outside of what may strictly be defined as home economics. Students taking home economics courses leading to a bachelor's degree should be required to take other groups of subjects having more or less direct relation to the life of men, women and children in the home and in the community. Such, for example, are courses in personal physiology, hygiene and medicine, principles of education, sociology, library science and others which in some colleges for convenience have been associated with the home economics department. It is desirable that home economics should be made a well-defined subject of reasonably limited range. For this reason our report begins with a definition of home economics.

Home economics, as a distinctive subject of instruction, includes the economic, sanitary and esthetic aspects of food, clothing and shelter as connected with their selection, preparation and use by the family in the home or by other groups of people.

Instruction in this subject should be based on scientific principles and graded according to the maturity, attainments and purposes of the student.

As in the case of other subjects, courses of instruction in home economics should be divided into general classes suited to the respective requirements of elementary and secondary schools, normal schools, colleges and universities.

In colleges and universities the work in home economics will naturally be pursued in three main divisions, research, interior instruction, and exterior instruction or extension work. The interior instruction may be given to undergraduates and graduates. With the development of collegiate instruction in home economics a variety of special courses will be offered in the larger institutions and the students will thus be given opportunity to specialize according to their particular aims, as, for example, if they intend to become housewives, teachers, nurses, physicians, managers of hotels or public institutions, etc.

At present it is desirable to set up and maintain a reasonable standard for undergraduate college courses in home economics, leading to the bachelor's degree. This paper will be confined to the consideration of such courses.

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Standard undergraduate college courses in home economics should be arranged with reference to students who have had the equivalent of general education covering eight grades in the elementary school and four years in the secondary school. If possible, students intending to take courses in home economics in college should study this subject at least two years in the secondary school and receive credit for this on entrance to college.

It is, however, recognized that under existing conditions many of the students desiring to pursue home economics courses in our colleges cannot receive instruction in this subject in the preparatory schools available to them. It is, therefore, recommended that college courses in home economics be arranged to meet the needs of such students, without requiring them to prolong the time needed to satisfy the college requirements for the bachelor's degree.

All courses in home economics should be developed with an orderly and carefully graded sequence of subjects and topics. They should also take into account that the study of the theory of the subject, including especially the scientific principles involved in it, is intended to give a rational basis for an efficient practice and that the student has not mastered the subject until he is able to practice the art, as well as expound its theory.

The general scheme of instruction should involve (1) the presentation of the subject in concrete form, with accompanying practice; (2) the development of the principles involved, with laboratory practice, and (3) the application of these principles in a rational system of practice more advanced in type, with opportunities for devising new methods of practice and for experimental work.

The standard undergraduate college course in home economics leading to a bachelor's degree should include the following subjects:

Required Subjects

- (1) Home architecture and sanitation.
- (2) Home decoration.
- (3) Textiles.
- (4) Selection and preparation of food.
- (5) Economic uses of food.
- (6) Household management.

Subjects from which choice must be made.

- | | | |
|--------------------------|---|-----------------------------|
| (7) Advanced cooking |) | |
| Dressmaking or millinery |) | At least one of this group. |
| Art needlework. |) | |
| | | |
| (8) Dietetics. |) | |
| Food and nutrition |) | At least one of this group. |
| Art in the home. |) | |

Such other electives in home economics as the college can offer.

The order of presentation suggested above is not essential but the subjects should be taught in some definitely related order.

For students who have not had instruction in home economics in preparatory schools the following minor college course is suggested, to be required of candidates for a bachelor's degree.

- (1) Plain sewing and garment making.
- (2) Cooking.
- (3) Home architecture and sanitation.
- (4) Home decoration.
- (5) Textiles.
- (6) Selection and preparation of food.
- (7) Economic uses of food.
- (8) Household management.

College students taking either of these courses in home economics should be required to add to them such groups of studies in mathematics, languages, science, economics, sociology, etc., as will make their whole college course a well rounded scheme of liberal education, comparable with the degree courses in other lines, and at the same time contribute to the thoroughness of their work in home economics. Students taking the minor courses in home economics might be allowed to elect additional work in home economics during the latter part of their college course.

Short courses and extension courses, not leading to a degree, should be arranged for separately and are not taken into account here. (647)

The Home Economics Association then undertook a study of the content of home economics as a distinct branch of knowledge and in 1913 issued an elaborate "syllabus of home economics", which outlined the subject under four main divisions, (1) food, (2) clothing, (3) shelter, and (4) household and institution management. The first three subjects were subdivided into (1) selection, (2) preparation and (3) use, and the fourth into (1) material basis, (2) social contacts, (3) activities and functions and (4) aims and results. The syllabus "does not represent an outline for a course of instruction, but rather a classified list of topics from which courses can be made." It served, however, to show to how great an extent the field of home economics had broadened in the thought of those who were promoting education in this subject. Home economics no longer was being developed on the basis of physics, chemistry and the biological sciences only but included much in the field of economics and sociology.

Another agency for the discussion of the problems of higher education in home economics which had considerable influence in strengthening the work in the land-grant colleges was the summer graduate school of home economics. This had its beginning in 1902 when Professor Atwater invited teachers of home economics to study four weeks at his laboratory at Middletown, Conn., primarily to become

acquainted with the nutrition investigations, but also to listen to lectures by various experts and to confer with each other on home economics problems. That same year the Graduate School of Agriculture was begun at Ohio State University. In 1906 the two schools cooperated in a session at the University of Illinois and this was continued at Cornell University in 1908, Iowa State College in 1910 and the Michigan Agricultural College in 1912. The American Home Economics Association assumed responsibility for this school in 1909. There was, however, difficulty in providing for the necessary expenses of this enterprise and the increase of regular graduate work at the colleges and universities lessened the need for this summer school, which at its best served principally to stimulate a desire for more advanced study. It was therefore discontinued.

The equipment for instruction in home economics at the land-grant institutions was greatly improved during the first fifteen years of the 20th century. At a number of these institutions substantial buildings wholly devoted to the work in home economics were erected and at others large space in old or new buildings was assigned to this department. Special laboratories, work-rooms, apartments resembling those in houses, etc. were provided and well equipped. For the more scientific work special apparatus was devised. Numerous text-books and manuals were issued, the general literature of home economics became extensive and State and Federal publications within this field were issued in large numbers.

The basis of support for the college courses in home economics was greatly strengthened by the constantly increasing breadth of the home economics movement in the lower schools. The Bureau of Education reported that in 1914 household arts were taught in elementary or secondary schools in over 3,000 towns and cities and in 2,400 high schools and 159 State normal schools. Some 252 colleges were giving instruction in home economics and 43 others were offering courses in applied sciences with reference to the home. Detailed statistics from about

35 per cent of these colleges showed 5,547 students in home economics courses, of whom 3,495 were studying for home use, 1,788 for teaching, and 264 for administrative positions as dietitians, household and institution managers, etc. In 20 colleges and universities, including 13 land-grant institutions, it was possible to take the master's degree by special graduate study in home economics departments and at the University of Chicago the degree of doctor of philosophy was given in the department of household administration. Advanced students interested in home economics could take the doctor's degree for special courses in the science departments of many universities and already a number of women engaged in home economics work had taken this degree.

In 28 land-grant institutions, including 14 universities, four-year undergraduate courses in home economics leading to the bachelor's degree were offered. While differing much in detail, these courses corresponded in a general way with that proposed by the American Home Economics Association. In many of these institutions the home economics faculty had been sufficiently developed to permit considerable specialization, particularly in junior and senior years. In addition, there were many short courses, summer schools, and much extension work.

By 1915 home economics instruction had become a permanent part of the American educational system in all its grades from the graduate school of the university to the elementary school. It had developed courses of instruction based on both science and practice and was definitely evolving standards for the different grades of courses. Research definitely related to the problems of home economics had already furnished considerable material for courses of instruction, especially in the field of food and nutrition. In the development of this educational system, particularly in its higher ranges, the land-grant institutions had an honorable and important part.

By the Smith-Lever Extension Act of 1914 home economics was linked with agriculture as an essential part of the broad system of cooperative extension work now carried on by the land-grant colleges and the United States Department of Agriculture in all the States.

Teacher-training

As the movement for agricultural education broadened and instruction in agriculture was introduced into secondary and elementary schools many teachers resorted to the agricultural colleges, chiefly for short courses, and a considerable number of students in the long courses went out from the colleges to teach agriculture.

Interest in the professional training of teachers was also becoming widespread and colleges and universities were establishing departments of education. This movement affected many of the land-grant institutions and some of them undertook special work relating to the training of teachers of agriculture.

In 1906 the Office of Experiment Stations reported that departments of education in which attention was given to training teachers of agriculture were maintained in land-grant institutions in Illinois, Missouri and Washington; and normal courses were offered in Arkansas, Colorado, Connecticut, Iowa, Kansas, Massachusetts, Mississippi, New York, North Carolina, North Dakota, Oklahoma and South Dakota. Summer schools for teachers were maintained in California, Connecticut, Georgia, Illinois, Kansas, Kentucky, Maine, Mississippi, New York, Ohio, Utah, Washington and Wisconsin. There were also departments of education in California, Georgia, Louisiana, Maine, Minnesota, Nebraska, Tennessee and Wisconsin.

At this time the land-grant colleges had difficulty in getting sufficient funds to meet expenses caused by their rapidly expanding work. At the meeting of the agricultural college association in 1906, the following resolution introduced by H. J. Wheeler of Rhode Island, was adopted:

"Whereas since the passage of the Morrill Act of 1890 no further Federal grants have been made for agricultural and mechanical education, notwithstanding the crying needs for such additional support: Therefore, be it

Resolved, That the executive committee of this association be authorized to cause to be introduced in Congress a measure drawn on the same general lines as the Morrill Act of 1890, providing for an increased appropriation for each of the land-grant colleges." (635)

Nelson Amendment to Morrill Act of 1890

This led to activities in which Prof. W. M. Hays, then Assistant Secretary Department in the University of Agriculture and formerly connected with the Agricultural College in Minnesota, was especially prominent. Largely due to his influence Senator Knute Nelson of Minnesota took this matter up and introduced on December 5, 1906, a bill for this purpose. It was also introduced in the House December 12 by Charles R. Davis, also of Minnesota. On January 16, 1907 Senator Nelson gave notice that he would offer his bill as an amendment to the appropriation bill for the Department of Agriculture and this was done February 21, 1907. The amendment was accepted by the Senate and though at first rejected by the House when the appropriation bill went to conference between the two houses, was finally accepted after considerable debate by a vote of 120 to 87, and was approved by President Roosevelt March 4, 1907. This measure provided to each State and Territory an additional appropriation under the terms of the Morrill Act of 1890. This fund began with \$5,000 the first year and \$5,000 more each year for four years, after which the annual sum was to be \$25,000. "The appropriation was carried through on the merits of agriculture. The law itself mentions the agricultural work prominently, and the discussion in Congress hinged almost exclusively on the value and growing importance of agricultural education and the need of developing that phase of our educational system."

Professor Hays was much interested in the extension of agricultural instruction to secondary and elementary schools, and undoubtedly suggested the proviso incorporated in the Nelson Amendment to the effect "that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts." In the statement of Mr. Nelson in explanation of his bill in the Senate and in the hearings

before the Senate Committee on Agriculture and Forestry, much stress was laid on the development of secondary and elementary education in agriculture and the need of training teachers for such work. The passage of this measure quickened the interest of the land-grant colleges in establishing teacher-training courses but the amount of the Nelson fund devoted to this purpose was disappointingly small.

During the year 1906-7 summer school instruction in agriculture was given to 925 teachers. In 1908-9 at least 26 of the colleges provided teacher-training courses in agriculture ranging from summer schools of a few weeks to regular four-year courses with additional graduate work. Several colleges had established departments of agricultural education. In 1910 46 of the agricultural colleges reported teacher-training work in agriculture. In more than half of these institutions the teachers' courses were four years in length and in 29 of them summer schools for teachers were held. More than eight times as many students enrolled in teachers' courses in agriculture that year as in 1909. For further account of the teacher-training work of these colleges see p.717 and p.883.

Secondary education in the Agricultural Colleges

When the agricultural colleges were first established there were comparatively few high schools or other preparatory schools easily accessible to farm children. The public and especially the farming people therefore thought that students from the elementary schools should be admitted to these colleges. This idea was carried over into the land-grant colleges in many States. Either the entrance requirements were kept so low that students with only the training received in the elementary schools were admitted to the freshman class of the college and the college instruction had to be largely of secondary grade or preparatory classes were organized in the colleges. These matters were more easily arranged in the separate agricultural colleges than in the universities, which in general had entrance requirements more or less conforming to those of standard colleges of that time.

Progress in bringing the entrance requirements of the land-grant colleges generally up to proper standards was relatively slow and depended largely on the general development of the public school system in the several States. The efforts of the Association of Agricultural Colleges and Experiment Stations through its committees to promote proper entrance requirements and actually collegiate courses in agriculture have been previously described.

When the Committee on Instruction in Agriculture made its first report on
(697)
secondary courses in agriculture in 1902[^] it recognized that a movement was already in progress in the colleges either to raise the requirements for admission and abolish the courses of lower grade or else to raise the requirements for the bachelor's degree and differentiate the preparatory or secondary courses from those of college grade. Following the latter plan the land-grant colleges in Minnesota and Nebraska had established separate schools of agriculture of secondary grade. The committee believed "that this is a better plan than to institute courses which are merely preparatory to the college courses given in the same institution. * * *

As many of our colleges are now organized it would not at present be practicable to wholly cut off the secondary instruction. It will, however, be a great gain to have the secondary instruction in agriculture, as in other subjects, clearly differentiated from the college courses in the mind of both the students and the public."

In 1903 the Office of Experiment Stations reported that agricultural schools with a two-years' course of high school grade had been organized at the colleges in Maine, Rhode Island and Oklahoma, and with a three-years' course in Washington. The Connecticut Agricultural College, which originally had been a secondary school, was providing a special group of studies for students coming from the common schools and at the New Mexico Agricultural College agriculture was being taught in the preparatory department. The rapid growth of the movement to differentiate secondary

work in the agricultural colleges is shown by the fact that in 1909 there were similar schools or short courses in at least 29 States, as follows: Alabama, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Idaho, Kentucky, Louisiana, Maine, Maryland, New Hampshire, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming. Such courses were supplemented to an increasing extent by brief and special courses. In this way the colleges attempted to meet the needs, as far as possible, of our people desiring some instruction in agriculture but unable to take the regular college courses. These short courses were described in Bulletin 139 of the Office of Experiment Stations, issued in 1903, as follows:

"For those actually engaged in agricultural occupations - the farmers, dairymen, and fruit growers, and their sons and daughters who are unable to leave home during the busy seasons - the special winter courses have been organized. These courses vary in length from a week or ten days to ten or twelve weeks. They are in most cases severely practical. They center around the judging pavilion, the laboratory, the dairy, and the cheese room, with lectures and readings to supplement the practicums. The nature of these courses is even more varied than their length of term. Twenty-two colleges offer courses in general agriculture, including more or less thorough instruction in plant production, animal husbandry, dairying, poultry culture, etc.; nineteen offer courses in general dairying; three in creamery management; two in farm dairying; two in cheese making; five in animal husbandry; nine in horticulture; four in poultry culture; three in domestic science, with more or less of horticulture, floriculture, and like subjects adapted to the needs of young women; and one each in agronomy, bee culture, forestry, beet-sugar production, farm mechanics, correspondence courses, botany, bacteriology, and entomology. Two colleges offer courses designated agriculture and horticulture; two, courses designated agriculture and dairying; and one, a course in agriculture, horticulture, and mechanic arts. Most, if not all, of these courses include instruction in a number of subjects not indicated in the names of the courses. There are also a large number of practicum courses and lecture courses which are confined to a single line of practice, such as cereal judging, stock judging, and the destruction of noxious insects. Six colleges offer a total of forty-four such courses.

The special winter courses are the utility courses, important because of their influence on the present-day agricultural practice and because of the influence of present practice on future practice. And present practice is sure to have a powerful influence on the young people who are to be the future farmers and on the quality of soil, farm machinery, and domestic animals with which these young people will have to do when they take charge of the farms. The special winter courses, then, are an important and legitimate feature of agricultural instruction, capable of giving a strong uplift to present agricultural conditions.

And, finally, there are the summer schools for teachers and the one-year and two-year normal courses, in all of which nature study and elementary agriculture are important features."

The number and variety of the short courses given by the agricultural colleges continued to increase throughout this period. By this means the colleges greatly increased the number of persons who through them received more or less instruction in agriculture and who principally as farmers or teachers spread the influence of the colleges in the rural communities.

In the colleges for white students in 1905 the number of persons in the shorter courses in 1905 was 4,631 and in 1910 it was 11,211, without counting 1,264 who took agriculture in the summer schools for teachers.

By doing this secondary and special work the agricultural colleges did a valuable service at a time when there was little serious instruction in agriculture outside. They also helped materially to promote the spread of instruction relating to agriculture in secondary and elementary schools. Further consideration of the work of the agricultural college with relation to secondary and elementary education will be given in the chapter on the progress of agricultural instruction in the lower schools. (See p.803)

Promotion of Instruction in Agriculture in the Elementary Schools

Closely connected with their extension work were the efforts of the agricultural colleges and the United States Department of Agriculture to aid the movement for the teaching of agriculture in the elementary schools. The nature-study work carried on by the agricultural college at Cornell University began in 1895 (see p.896). There was also some similar work by the colleges in other States. Then came the school garden movement and this was actively aided by the agricultural colleges and the Department of Agriculture. (See p.898) Both nature-study and school gardening were largely taken up by the city and village schools and only affected the rural schools and farm children to a limited extent. To reach the rural schools more definitely and extensively it was found necessary to deal with the plants, animals, birds, insects, etc. which aid or hinder the farmer in his work and to make this nature-study a basis for the subsequent study of agriculture in the elementary and secondary schools.

The agricultural colleges individually and through their association aided this movement by the formulation of courses of instruction for the elementary schools, training of teachers, special courses for teachers in service at summer schools, preparation of text-books and manuals, and in other ways. Their relations to the teaching of agriculture in the elementary schools will be more fully described in a later chapter. (See p.907)

Extension Work

From the beginning of the 20th century until the passage of the Smith-Lever Extension Act in 1914 the agricultural colleges were very active in developing various forms of extension work and together with the National and State Departments of Agriculture were laying the foundations for an unparalleled system of practical education in agriculture and home economics which was to reach multitudes of the farming people and profoundly affect the development of a better agriculture and country life in the United States. Only enough will be said about this subject at this time to show its intimate relation to the general educational program of the colleges.

The extension work of the agricultural colleges was an outgrowth of the addresses delivered at meetings of agricultural societies, at fairs and at other gatherings of farmers during all the nineteenth century. From the beginning these addresses included some on the more technical phases of agriculture and its relations to the sciences, delivered by college teachers or persons having special knowledge of the subjects they treated. In 1861 the Michigan legislature passed an act which contained a provision that "the professors of the college may give lectures to farmers away from the college."

About 1870 meetings called Farmers' Institutes began to be held in Massachusetts and Kansas ^{and Iowa} and these were gradually developed into a regular system of meetings under public control, organized and managed by the agricultural colleges or State boards or departments of agriculture and supported by public funds. Whatever authority controlled the institutes, the officers of the agricultural colleges quite generally participated in them in the several States. The experiment stations made large use

of the institutes for the dissemination of the practical results of their investigations. The Office of Experiment Stations therefore promoted the institutes and in 1903 under a special appropriation by Congress established a division for its work relating to them.

Following the decline of the lyceum movement, partly as a result of the Civil War, there began in 1874 the more systematic Chautauqua movement. This was not connected with educational institutions but consisted largely of literary and scientific circles, which were to a certain extent assisted by summer schools and correspondence courses managed by university professors. For a short time some degrees were granted by the University of the State of New York on the completion of Chautauqua courses.

Meanwhile the American universities and colleges had been influenced by the system of so-called University Extension which had been inaugurated in England in 1866 and had been taken up by Cambridge and Oxford Universities and other educational institutions there and in other countries. In the United States this was first introduced through activities of city libraries, especially in Buffalo, Chicago and St. Louis, and by 1890 it had received sufficient attention to bring about the organization of the American Society for the Extension of University Teaching.

The following year an appropriation of \$10,000 was made by the State of New York for the organization and supervision of University Extension Work, but none of this money was to be spent for lecturers.

In 1892 the University of Chicago included provision for university extension in its original plan of organization and began the employment of a staff for this purpose. That year the University of Wisconsin also began organized extension work and in 1906 established a department of university extension which developed this work on a broad scale. "Between 1906 and 1913, inclusive, 28 institutions organized university extension and between those dates 21 institutions reorganized the work," usually by establishing definite extension departments.

The extension work of the agricultural colleges was more or less influenced by this general movement . An early and important development of organized extension work in agriculture took place in the State of New York. The origin of this was a request by farmers in Chautauqua County, which was largely devoted to grape-growing, for experiments suited to their needs by the experiment station at Cornell University. The station had no funds for this work and the farmers therefore appealed to the legislature in 1894.

About this time L. H. Bailey, then professor of horticulture at Cornell University, had suggested that State aid should be sought for publishing information and holding horticultural meetings. S. F. Nixon, assemblyman from Chautauqua County, secured the passage of an act which granted \$8,000 to be spent by the experiment station in 16 counties in Western New York for horticultural experiments, investigations, instruction and information. (323) This fund was increased to \$16,000 in 1895. Professor Bailey was put in charge of this work. Experimental work, largely of the nature of tests or demonstrations was conducted on a considerable number of farms, together with one or two day meetings, sometimes accompanied by demonstrations such as orchard spraying, horticultural schools of two to four days, and the publication of popular bulletins.

In 1896 the extension work was expanded to include (1) itinerant or local experiments as a means of teaching, (2) readable, expository bulletins, (3) itinerant horticultural schools, (4) elementary instruction in nature-study in rural schools, and (5) instruction by means of correspondence and reading courses. (325) This plan was so successful that the legislature in 1897 broadened the scope of the work to include the whole State and agriculture in general. The appropriation was increased to \$25,000 to be spent under the supervision of the director of the New York College of Agriculture, as follows:

"In giving instruction by means of schools, lecturers and other University Extension methods, or otherwise, and in conducting investigations and experiments; in discovering the diseases of plants and remedies thereof; in ascertaining the best methods of fertilization of fields, gardens and plantations; and best modes of tillage and farm management and improvement of live stock, and in printing leaflets and disseminating agricultural knowledge by means of lectures or otherwise; and in preparing and printing for free distribution the results of such investigations and experiments, and for republishing such bulletins as may be useful in the furtherance of the work; and such other information as may be deemed desirable and profitable in promoting the agricultural interests of the State." (342)

That year besides the horticultural investigations, 200 local experiments with various crops were conducted, 10,000 teachers were reached through visits to schools, lectures at teachers' institutes and distribution of nature-study leaflets, 15,000 pupils were enrolled for nature-study and 1,600 young farmers took correspondence courses.

Afterwards Junior Naturalists Clubs were formed and a nature-study monthly was issued. Separate Reading Courses for farmers and their wives were organized. A winter's course at the college was also included in the extension program. An extension division was created in the college and there was much personal work by college officers at meetings throughout the State.

In 1902, 29,792 persons were enrolled in the Farmers' Reading Course, 9,500 in the Farmers' Wives' Reading Course, 1,800 in a Home Nature-Study Course for teachers, 20,000 in Junior Naturalists Course, and 26,000 in Junior Gardeners Course.

This extension work in New York attracted much attention throughout the country and the Cornell publications, which were on many subjects and attractively presented, were widely distributed and discussed.

The Pennsylvania State College established a reading course in 1892. This was first called the Chautauqua Course of Home Reading in Agriculture and then Home Study. At first the college simply provided books and gave the readers examinations when they desired. After a time it was found desirable to aid the readers through correspondence and in 1897 the sending out of printed lessons on particular subjects treated in the books was begun.

1199

In 1898 the name of the enterprise was changed to Correspondence Courses in Agriculture. On March 1, 1899, the total enrollment of students was 3,416, including those in the Chautauqua course but 460 had received instruction by lessons. To these over 1,800 lessons had been sent and over 1,100 examinations papers had been graded. There were students in most of the States and in some foreign countries. Their ages ranged from 15 to 75 years and averaged about 33 years. This plan involved so much work by the college officers that it was not found practicable to take care of a very large number of students. Professor Bailey compares the Pennsylvania and New York reading courses as follows:

"The older or Chautauqua-Pennsylvania idea is that of a definite, prescribed, self-limited, technical correspondence curriculum, the completion of which is signalized by a certificate or diploma. The other, or Cornell idea, is that of a flexible, nonlimited, untechnical reading course in which there is no system of counts, and which does not lead to certificatory honors. The former is intensive; it is adapted to the few. The latter is elementary: it is adapted to the many. Each is incomplete." (324)

Colleges in several other States undertook similar work prior to 1900.

In 1905 the Association of Agricultural Colleges establiished a standing committee on extension work, of which K. L. Butterfield was the first chairman. This committee had the active assistance of Prof. John Hamilton, farmers' institute specialist in the Office of Experiment Stations, who acted as its secretary. The first report of this committee was made to the association in 1906. This includes a tentative definition as follows:

"Extension teaching in agriculture embraces those forms of instruction, in subjects having to do with improved methods of agricultural production and with the general welfare of the rural population, that are offered to people not enrolled as resident pupils in educational institutions." (658)

Four groups of such extension work, appropriate to educational institutions, were made, (1) farmers' institutes; (2) itinerant lectures other than farmers' institutes, including single lectures or courses, lectures connected with special railroad trains, traveling schools, etc.; (3) literature and correspondence, including traveling libraries; (4) those efforts in which particular

emphasis is laid on object lessons or outdoor practicums, including field demonstrations, cooperative tests, exhibits at fairs, visits to colleges and experiment stations. In another group were included those activities of rural societies which have educational aspects and in which the colleges render much assistance, including the programs at meetings of the societies, study clubs, boys' and girls' clubs, etc.

The special and short courses at the colleges were not included in the work of this committee. It was found that there were over 300 centers of extension work in agriculture, including the agricultural colleges and experiment stations, other colleges, normal schools, industrial high schools, State and county departments of public instruction and agriculture, state and county agricultural organizations, granges, agricultural press, libraries, and industrial organizations. To these should have been added the United States Department of Agriculture, including the farmers' cooperative demonstration work in the Southern States, **under Seaman A. Knapp.** The committee recommended that each college in the association organize as soon as practicable a department of extension teaching in agriculture, or if this was not immediately practicable a faculty committee on this subject.

The association committee's report in 1907 showed that the agricultural colleges in 39 States were doing extension work. Much of this was in connection with the farmers' institutes, which in a number of States were under the direction of the college. In North Carolina, Nevada and West Virginia faculty committees on extension work had been appointed and in Illinois, Kansas, Maryland, Michigan, Mississippi, North Dakota, Ohio, Pennsylvania, and South Carolina the extension work of the college was under a superintendent or director.

The colleges in Indiana, Massachusetts, Minnesota and Rhode Island were doing extension work in a number of different lines. In New York work was being done in 14 lines and the college was getting ready to establish an extension division which was partially done in 1908 by the creation of an Extension Office. The Iowa State College received a State appropriation of \$15,000 for agricultural extension.

sion in 1906, when an extension department was organized with a superintendent and lecturers on soils, animal husbandry, domestic science, dairying, horticulture and farm crops.

The extension work developed rapidly between 1905 and 1910, when it was reported by the Committee on Extension Work that there was organized work in 35 institutions. In over 20 of these there was an extension department or division. A number of the States were making considerable appropriations for this work and there was also an increasing amount from local sources. It was estimated that the colleges had that year in the aggregate about \$400,000 for extension work. The work had become more varied in character and some of the newer features such as the farmers' weeks at the colleges, institutes and demonstration work for women, and boys' and girls' clubs were becoming very popular.

The need of a greater opportunity for discussion of administrative and other problems of extension work in connection with the meetings of the agricultural college association had been recognized by its Committee on Extension Work as early as 1908, when the committee recommended the establishment of a section on extension work in the association. Objection to this was raised on the ground that the problems of the extension work were so intimately associated with those of the general administration of the educational work of the colleges that it was not wise to make a separation of these interests in the organization of the association.

Failing to get action on this matter the friends of this movement secured the introduction of an amendment to the constitution of the association providing for an extension section and this was adopted in 1909.

During the next four years the growth of the extension enterprises was greatly accelerated. The appropriations for this work from State and local and other sources aggregated about \$1,000,000 in 1913. At the colleges in 38 States there were extension departments. Thirty-one of the colleges reported that 182 persons were employed full time on extension work, and 217 part time. Movable

schools, educational trains, country-life conferences, men and women demonstration agents, boys' and girls' clubs, boys' encampments, demonstrations at State and county fairs, and farmers' weeks were prominent features of the work. Over 7,500 farmers' institutes with a total attendance of 4,000,000 persons were held by the agricultural colleges and state departments of agriculture in 1912. The colleges were becoming more closely related to the cooperative demonstration work carried on by the United States Department of Agriculture. This work was very popular in all the Southern States and was spreading rapidly in the North and West. It was evident that a stronger and more thoroughly unified organization for extension work was needed.

The complexity of the work and the problems before the college at this time are shown in the following extract from the report of the Farmers' Institute Specialist of the Office of Experiment Stations in 1912:

"Among the activities especially reported were the organization of clubs and conducting contests in corn and tomato growing, pig rearing, fruit and vegetable production, canning, sewing, cookery, and stock judging. Also in organizing cow-testing associations; distributing pure seeds; organizing and conducting cooperative experiments; conducting field and orchard demonstrations; establishing county demonstration agencies; organizing and conducting courses for the preparation of teachers in agriculture; conducting movable schools, correspondence courses, and branch short courses; distributing leaflets of information; equipping and conducting instruction trains; carrying on farm surveys; and conducting educational practicums in connection with farmers' institutes. There is great diversity among the colleges in methods of operation as well as in the number employed in conducting extension activities, in the amount of money appropriated, and in the time devoted to extension work.

The recent extraordinary and rapid development of the extension feature in education has given rise in the agricultural colleges to questions of organization, administration, and forms of instruction whose proper solution is not important to the future success of this movement. Reports received by this office show great diversity of practice and view respecting these points, with very little that has been sufficiently developed to be recommended as generally applicable and altogether complete in detail.

There is need, therefore, for further discussion of the problems involved, particularly of those preliminary and essential features embraced by the terms organization and administration. The uniting of this new department of instruction with the other work of the institution so as to become an organic part of that work and representative of the instruction given by the college and of the researches and discoveries by the experiment station is most important and pressing." (564)

The popularity of the extension work grew so rapidly from year to year that though the funds materially increased the colleges were not able to meet the demands for this work without at least indirect encroachment on the funds given them for research and teaching. Therefore there arose a movement to secure Federal funds for extension work. This was first proposed in the report of the Committee on Extension Work to the Agricultural College Association in 1908 and was made more definite in 1909 by a proposal that Congress be asked to appropriate \$10,000 a year to each State and Territory and additional amounts after two years conditioned on State appropriations as offsets.

The association that year approved the general principle of a Federal appropriation. The matter was then taken up by the executive committee of the association. On December 15, 1909, Hon. James C. McLaughlin of Michigan introduced in the House of Representatives a bill which embodied in many particulars the recommendations of the executive committee. This bill was actively supported by the association.

Meanwhile the friends of agriculture and industrial education in the secondary schools had secured the introduction of the Davis Bill granting Federal funds for such schools and there was also a bill for Federal aid to normal schools. A combination of these bills was then attempted in the Dolliver Bill and later in the Page Bill. (See p. 857) This led to a long discussion in Congress regarding the policy to be pursued in granting further Federal aid to the States for educational purposes. The control of the House of Representatives passed from the Republican to the Democratic party. Hon. Asbury F. Lever of South Carolina then introduced an extension bill and this passed the House but failed by one vote in the Senate.

On January 16, 1912, Mr. Lever introduced in the House and Hon. Hoke Smith of Georgia in the Senate a new bill for the establishment of extension departments in the land-grant colleges, which with amendments was passed and approved by President Wilson, May 8, 1914. This measure made possible the

combination of all the useful features of extension work in agriculture and home economics as carried on by the colleges and the United States Department of Agriculture and opened the way for a great expansion of such work among our farming people.

Exhibit at the St. Louis Exposition

An important piece of extension work by the land-grant colleges was their collective exhibit at the Louisiana Purchase Exposition at St. Louis, Mo., in 1904. Preparation for this work was begun at the meeting of the agricultural college association in 1901 when a committee report recommending an exhibit "of the progress of education and research in agriculture in the institutions represented in this association" was adopted and a committee to prepare the exhibit was appointed. Another committee was also appointed to prepare an exhibit on mechanic arts.

The following year it was decided to unite these committees and have a unified exhibit. (677) When Congress was asked to appropriate \$60,000 for installing and maintaining this exhibit the live-stock interests asked for special arrangements for an exhibit of research and instruction in animal husbandry with the result that Congress appropriated \$100,000 to be spent under the direction of the Government Board for the Exposition, in cooperation with a committee of the agricultural college association.

A space of about 11,500 square feet was secured in the Palace of Education for the main exhibit. A supplementary exhibit in stock and grain breeding and judging was provided for in Live Stock Congress Hall in the agricultural section of the fair grounds.

In the Palace of Education there were central exhibits of the Bureau of Education and the Office of Experiment Stations showing the relations of the Federal Government to the land-grant colleges and the agricultural experiment stations and the general progress of education and research in agriculture and mechanic arts.

The exhibits of the colleges and stations were grouped under (I) agronomy, or plant production, including (1) a plant laboratory in operation illustrating methods of research and instruction in botany as related to agriculture, (2) a soils laboratory, (3) fertilizers, (4) field crops, (5) horticulture and forestry, (6) plant pathology and (7) entomology; (II) zootechny, or animal industry, including (1) investigations, illustrated by apparatus, specimens, charts, etc. showing methods and results of research on feeding stuffs, metabolism and the laws of nutrition, (with working model of the Armsby respiration calorimeter) and the practice of feeding; and (2) instruction, illustrated by a class-room equipped with implements, apparatus, charts, photographs, etc. for instruction relating to normal domestic animals and in veterinary medicine; (III) Agrotechny or agricultural technology, with dairy and sugar laboratories and a still exhibit on control work; (IV) Rural engineering or farm mechanics, including irrigation, drainage, farm buildings, and implements, and (V) Rural economics or farm management, showing courses of study and statistics. Under Mechanic Arts there were exhibits in civil, mechanical, electrical and mining engineering, technical chemistry and architecture, drawing and shop practice. The equipment of the land-grant colleges for instruction in home economics was also shown, together with the methods and courses of instruction and some of the results of the work.

The outside exhibit was organized as a "School of breeding, feeding and judging of live stock and of breeding of field crops." This school was held in two sessions of two weeks each.

"The plan followed was to have 25 students from five different agricultural colleges present to act as a class for the instructors to use in demonstrating their methods of teaching live-stock judging, dressing and curing meats, judging grain, making gluten, sponge and baking trials with flour, and in grading and milling wheat."

200

"An abattoir and refrigerator rooms were provided and demonstrations were made in judging all of the market classes of live stock for the block. Students were given demonstrations in slaughtering, cutting, and curing meats under the inspection of interested World's Fair visitors. Exercises in judging corn and small grain, and in placing rings of all the market and breeding classes of cattle, sheep, and swine constituted the programmes rendered from day to day. Evening sessions as well as forenoon and afternoon exercises were held daily. Moving pictures representing the active work of students in judging live stock, studying farm mechanics, judging corn, carrying out agricultural engineering class exercises, and the work of plant and animal breeding constituted a portion of the evening programmes. Addresses upon various phases of plant and animal breeding and the methods of instruction followed in kindred subjects filled the remaining available time during the four weeks that the exercises were carried on."

In the plant breeding exhibit "Matured plants of oats, wheat, barley, spelt, millet, flax, and young plants of corn were set in natural form with interspaces about two-thirds as great as they usually occupy in plant nurseries. They were shown in all stages, some with clipped borders, others partially culled out in selecting the better plants, and others with the final or choice seed plants alone remaining. In other plats the plants were harvested and placed in their receptacles. Specimen record books were on exhibition and the forms of plant pedigrees which are kept were displayed to the public. All forms of plant records and labels used in experimental work were in their natural position, so that visitors were able to see an entire system which has been found practicable by investigators. Ripe bundles of grain were exhibited as they are placed in the field at harvest time and a thrashing machine for plant-breeding work was also on exhibition. A nursery fanning mill, an electric bake oven, and a small patent roller test mill were all exhibited in active operation. Nitrogen and fat extractors used in corn-breeding work were features of the display." (553)

This collective exhibit as a whole gave educators and the general public a better understanding of the breadth and strength of the educational work of the land-grant colleges, especially on their agricultural side, and this was emphasized by the prominent place of the exhibit among those of different classes of our educational institutions.

The farming people who visited the exposition were also impressed by the elaboration of the equipment for agricultural instruction, the wide range of the work and its direct bearing on practical problems of the farm and home. The exhibit was thus one of the factors which in the years immediately following promoted the building up of strong agricultural colleges, especially in the great agricultural regions of the United States.

Agriculture in Private Colleges

In the years immediately following the passage of the land-grant act of 1862, the teaching of agriculture in private colleges almost entirely ceased and it was not until agricultural instruction became firmly established and was attracting many students in the institutions receiving the benefits of that act that private colleges in a few places offered agricultural courses. The specialization of collegiate courses in agriculture and the large equipment of land, buildings, live stock and apparatus required for such work checked this movement and there is no present tendency for its further spread.

In 1915-16 18 such colleges in 12 States reported to the Bureau of Education that they were giving some instruction in agriculture. In most of these institutions only one or two teachers of agriculture were employed and the equipment was comparatively meager.

In 1919-20 only 8 private institutions in 7 States reported instruction in agriculture. Of these the most important were Notre Dame University in Indiana with three teachers and 39 students in agriculture and Syracuse University in New York with 8 teachers, 106 students and 12 graduates. The latter institution also had the New York College of Forestry supported by State funds. Yale University also had a school of forestry and New York University, a veterinary college.

Agricultural Education for Negroes

After the Civil War it was necessary in the Southern States to establish schools for negroes, most of whom were illiterate. The burden of creating and maintaining a public school system which involved separate schools for the two races was very heavy for these impoverished States. As far as public funds were used for negro education they were almost entirely used for elementary schools. For the training of teachers and other leaders of the negroes, private funds, largely from the North, were employed but such funds were far from adequate. Vocational education was a very new thing in any part of the country and in the South the

schools generally followed the old academic program. Naturally, the negroes thought this should also be their educational program. The secondary and collegiate institutions for negroes in the South were for the most part under control of religious denominations and devoid of vocational instruction.

Among the very few people who thought it would be practicable to establish industrial schools for negroes was General Samuel C. Armstrong who undertook in 1865 to found such a school. This was opened at Hampton, Va., in 1868, under the American Missionary Association but in 1870 was chartered as an independent institution under the name of "The Hampton Normal and Industrial Institute." Its officers and teachers were white because General Armstrong believed that the negroes needed white leadership in education. Here at first elementary academic studies were combined with instruction and practice in various trades, household tasks and agriculture. A regular agricultural course was not established until 1890. Much attention was paid to the training of teachers and graduates of Hampton Institute went into many schools throughout the South.

In 1872 the State of Virginia gave to Hampton Institute one-third of the interest on the land-grant fund established under the Act of 1862 and after the passage of the Morrill Act of 1890 a similar share of that fund was given to this school. Those funds, together with increasing amounts of money derived from private sources, enabled the institute to greatly expand its normal, industrial and agricultural work.

In 1881 Booker T. Washington, who had studied at Hampton, opened the Tuskegee Normal and Industrial Institute, with the aid of an appropriation of \$2,000 from the Alabama legislature. This school was very successful and had negroes as officers and teachers. It was incorporated in 1893, with a board of trustees largely composed of white persons, and was chiefly maintained with private funds, which came to it in increasing measure. The general plan of instruction was similar to that of the Hampton Institute. Considerable emphasis was laid on agricultural

instruction and under the direction of Prof. George W. Carver, a graduate of the Iowa State College, considerable experimental work was undertaken. Tuskegee Institute did not, however, receive any share of the land-grant or Morrill funds.

The influence of the Hampton and Tuskegee Institutes became great throughout the South and the separate colleges for negroes established under the Morrill Act of 1890 largely followed their plan of organization and work, as far as this was possible with the limited funds at the disposal of these State institutions. At least seven of the State colleges for negroes had their beginnings prior to 1890 but in only three of them were agricultural courses established before that time.

In 1903 the Office of Experiment Stations made a survey of the State colleges and schools for negroes which were receiving the benefits of the Morrill Act of 1890. (547) There were then 16 of these institutions, in the Southern States, except Tennessee. They were all commonly called "land-grant" colleges, though only those in Kentucky, Mississippi, South Carolina and Virginia participated in the benefits of the Act of 1862, by receiving annually a portion of the interest on the land-grant fund.

"The total revenue of the colored institutions in the fiscal year 1902-3 was \$537,738.45. Of this amount \$205,554.94 was received from the Federal Government, \$159,264. from the States, and \$172,919.51 from fees and other sources. The largest revenue (\$194,046.96) was received by Hampton Normal and Agricultural Institute, and the smallest (\$9,005.49) by the Delaware State College for Colored Students. The average total income per student was \$88; that of the white colleges was \$173 - nearly twice as much.

The equipment of these institutions is valued at nearly \$2,000,000, of which 67 per cent is represented by buildings. The approximate total value of farms and grounds is \$300,000; of apparatus, \$41,400; of machinery, \$3,300; of libraries, \$30,400, and of live stock, \$27,600. More than half of the live stock is owned by one institution - the Hampton Institute. That these institutions are gaining in wealth is shown by the fact that more than 8 per cent of their total equipment has been added during the past fiscal year.

The total number of students in the colleges and schools for negroes in 1902-3 was 6,080; the number of graduates, 422; the number of degrees conferred, 119; the number of instructors, 346.

211

The statistics show that 71 per cent of the students in the negro institutions were in the preparatory courses and only 12 per cent in the collegiate courses. But of the graduates of these institutions only 28 per cent received bachelors' degrees, and, furthermore, 269 (nearly 36 per cent) of the students reported as being in collegiate courses were in attendance at an institution which is admittedly a secondary school and grants no degrees; so it is safe to assume that not more than three or four per cent of the students in the land-grant colleges for negroes were in the four-year courses leading to bachelors' degrees. This, in itself, is not to be taken as an unfavorable criticism of the institutions, except in so far as the figures are slightly misleading, for it is known that much of the most useful work done by them is done in the secondary and special courses; but it is an indication of the grade of instruction that must be provided for nearly all of the people served in these colleges and schools."(547)

All but one of these institutions were teaching agriculture and more than one-fourth of their students were taking agricultural courses of some sort. In most of them, however, the agricultural work was in poorer condition than the industrial and academic work. Agricultural manuals and text-books were comparatively few and often antiquated. Only two or three of these institutions had any laboratory equipment for teaching agriculture. Those that had farms with thoroughly modern equipment and were practicing diversified farming were the exceptions.

There were some good teachers of agriculture but too often they were either farmers without special training or aptitude for teaching or they were men who had received theoretical instruction in Northern colleges and were too scientific and impractical, not knowing how to adapt their instruction to the conditions existing in these Southern schools.

Part of the weakness of the agricultural work of these schools was due to white men on their boards of trustees, who either had no real sympathy with vocational education or thought that negro students needed only ordinary negro farmers to instruct them in agriculture. Under such circumstances the negro boys, if allowed freedom of choice, avoided the agricultural course and took instruction in wood or iron working, tailoring, and other trades. They had also a powerful incentive to such a course in the fact that men skilled in the trades could immediately earn much better wages than farm laborers.

Some progress was made during the 10 years following 1903 in improving the equipment and the courses of instruction in agriculture in most of these institutions but the number of agricultural students fluctuated considerably from year to year and did not materially increase at any time during this period.

In 1905 out of a total of 6,294 students in the negro land-grant institutions 1,624 were in agricultural courses and in 1912 out of a total of 8,495 students 2,173 were in agricultural courses. Some of these institutions in 1912 had from 8 to 58 agricultural students, four had from 100 to 181, and five from 200 to 413. That year the total number of collegiate students claimed by all these insritutions was 1,544 but without doubt most of these were actually pursuing courses little if any above secondary grade. Seven were giving instruction in agriculture to teachers through summer schools or special courses. The Hampton and Tuskegee Institutes began to do extension work at an early day and some of the other institutions attempted this in a small way.

After 1915 interest in these institutions grew rapidly in the Southern States and they were greatly strengthened by increased State appropriations, which in 1925 aggregated \$1,455,260. The value of their buildings and equipment rose from about \$2,500,000 in 1914 to nearly \$8,000,000 in 1925. Fifteen of these colleges were made headquarters for the Smith-Lever extension work for negroes and sixteen received Smith-Hughes funds for the training of teachers of vocational subjects. Of their 586 teachers in 1925, 323 were college graduates. Including their summer schools their students that year numbered 13,690, of whom 4,047 were in secondary work, and 2,169 in collegiate courses. In vocational agricultural courses there were 579 students and in teacher-training courses in agriculture 203 students. An Association of Negro Land-Grant Colleges had been formed, which in cooperation with the Bureau of Education was working toward the standardization of courses and the improvement of teaching.

Part VI.

Enlarged Scope of Work of Agricultural Colleges 1912-1925.

PART VI

Enlarged Scope of Work of Agricultural Colleges 1915-1925

The Smith-Lever Extension Act*

The Smith-Lever Cooperative Extension Act not only greatly increased the extension work of the state agricultural colleges but it also fundamentally changed their relations with the Federal Government and with the rural communities throughout the States. In its title and in its terms this act provides definitely for close cooperation between the state colleges and the United States Department of Agriculture. The nature of the work and the cooperation contemplated are clearly set forth in the act as follows:

"That cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges receiving the benefits of this act."

Ten thousand dollars annually are appropriated to each State accepting the provisions of the act and additional sums in proportion to the State's relative rural population out of lump sum appropriations from the Federal Treasury beginning with \$600,000 in 1915 and increasing by \$500,000 annually for seven years, after which this additional fund is annually to be \$4,100,000. But the State will receive only so much of its annual allotment from this additional fund as is offset by sums derived from sources within the State.

The act was passed with the understanding that the county agent system involved in the farmers' cooperative demonstration work and farm management work carried on previously by the Department of Agriculture would be incorporated in the Smith-Lever extension work. For this reason the act permitted contributions by counties, local authorities or individuals, as well as by States and colleges, to be used to offset Federal funds granted for extension work. The agricultural colleges were thus obligated not only to extend their instructional

operations throughout the State but also to establish centers for such instruction in the counties, at least as far as cooperative funds were provided from county sources. The Smith-Lever extension system is thus radically different from the ordinary "university" extension work. It contemplates close local union of rural communities with the college and the actual permanent functioning of the college in these communities throughout the State.

To provide a practical plan for cooperation between the colleges and the Department of Agriculture in carrying on work under the Smith-Lever Act a "Memorandum of Understanding" was signed by the Secretary of Agriculture and the college presidents in 46 States and a similar understanding was reached more informally in the other two States. This memorandum provides (1) that the State shall organize and maintain a definite and distinct administrative division of the college for extension work; (2) that the head of this division, commonly called extension director, shall administer all the extension work in the State as the joint representative of the college and the department, (3) that all funds for extension work in agriculture and home economics shall be expended through such extension divisions; and (4) that the department shall cooperate with the extension divisions of the colleges in such work done by the department in the States.

Congress continued appropriations to the department for farmers' cooperative extension work and these were chiefly used to pay part of the salaries of State leaders and county agents. The extension system established under the Smith-Lever Act and related Federal and State legislation, therefore, brought about close cooperation, on a financial basis, between Federal, State, county and community agencies to an unprecedented extent.

To transact the Federal business made necessary by the Smith-Lever Act the department established immediately a States Relations Committee and beginning with July 1, 1915, the States Relations Service. This Service included

the former Office of Experiment Stations and the two offices of extension work transferred from the Bureau of Plant Industry. The director of the Office of Experiment Stations was made director of the States Relations Service. The new service thus dealt in a broad way with the relations of the department with the agricultural colleges as regards their research, resident teaching and extension work. And the continuance in this service of the chief officers who for many years had been in close touch with the agricultural colleges throughout the country gave assurance that the general policies of relations between the department and the colleges would be continued. This also made for an easier and more satisfactory adjustment of the details connected with putting into effect Federal and State legislation which necessitated considerable reorganization of the colleges, conditioned to a great extent on State and local differences of means, equipment, personnel and methods of procedure.

(695)
As shown in the previous chapter, [^]the colleges had developed much extension work in a considerable number of different lines and were employing many persons for the whole or a part of their time in this kind of service. The department on the other hand had developed the demonstration work largely on an independent basis. Over 900 counties had the services of an agricultural agent in 1914 and about 275 counties had in addition a home demonstration agent. Counting the State and district agents about 1,400 persons were engaged in the department's extension work and the funds from Federal, State and private sources used in this work aggregated over \$1,000,000. About 1,150 of these extension agents were employed in the Southern States. It seemed very desirable, and practically essential, to combine the extension forces of the department and the colleges in the new organization of extension work under the Smith-Lever Act. To bring this about in the best way involved a very great amount of careful administrative work in the colleges, as well as in the department. Problems connected with the organization or reorganization of extension divisions, determination of the re-

lations of extension administrators, specialists and county agents to college departments and faculties, adjustments of salaries of extension workers to suit varying conditions and precedents in college administration, provision of space and equipment for the extension organization in college buildings, arrangements for preparing, printing and distributing extension publications, etc., necessarily required a large share of the time and thought of college officers and faculties for a considerable period after the passage of the Smith-Lever Act. One interesting result of the extension system projected in that act was the closer and more permanent union of the home economics work of the land-grant institutions with their agricultural work. In its relations with the rural communities the home economics extension work came to function through the extension divisions of the agricultural colleges. In some Southern States where the agricultural colleges were not coeducational it was necessary to make special arrangements for the conduct of the extension work in home economics either by creating a division for this work in the extension service or in the case of Florida and South Carolina by securing the cooperation of the State women's colleges. But this involved close working together of the agricultural and home economics agents, particularly in the counties, and ultimately led in Alabama to the admission of women and the creation of a home economics department of instruction in the Polytechnic Institute.

The reorganization and development of the cooperative extension system under the Smith-Lever Act proceeded rapidly and on the whole very satisfactorily. The work was cordially received by the farming people and through it public support of the agricultural colleges was materially strengthened. By 1917 the system in all its main features was well established. The total funds from Federal and State sources for this work increased from \$3,600,000 in 1915 to \$6,150,000 in 1917. And the States and counties not only furnished the full offset required under the Smith-Lever Act but contributed in 1917 about \$2,335,000 additional funds, of which the counties gave \$1,260,000. The number of counties with agricultural agents increased

from 928 in 1914 to 1,434 in 1917 and the number with home demonstration agents from 279 to 537. The total number of persons engaged in extension work in 1917 was 2,983 men and 1,117 women, total 4,100. Of these 2,238 men and 787 women, total 3,025, were employed for their full time.

Relations of the Agricultural Colleges with State Departments of Agriculture

The large development of the extension work of the colleges under the Smith-Lever Act stimulated discussion of their relations with the State Departments of Agriculture. Where these departments were weak and had few technically trained employees, much of the scientific work connected with the control of fertilizers, feeding stuffs, etc., and sometimes the administrative work, had been given to the experiment stations. On the other hand the State departments had often managed the farmers' institutes. As the departments became stronger, with the passage of numerous State laws enlarging their regulatory and other functions, it became apparent that some readjustments of their work were very desirable in order that there might not be duplication of effort and friction in their relations with the college. This matter was taken up at a meeting of the Association of Commissioners of Agriculture in 1917 and the field of work of the departments was outlined by a committee, as follows:

"Proposed Field of Work of Departments of Agriculture General Denomination Control, Regulation and Administration Typical Lines of Work

- I. Control and regulation
 1. Livestock sanitation
 - A. Quarantines
 - B. Control of outbreak of diseases.
 2. Plant disease regulation
 - A. Orchard and nursery inspection
 - B. Control of outbreaks
 3. Dairy and food control
 4. Seed inspection
 5. Feed and fertilizer inspection
 6. Stallion enrollment

II. Administration

1. State fair
2. Immigration and colonization
3. Agricultural statistics
4. Markets

Notes

I. Promotion of control projects

1. Cooperation with Agricultural Colleges and Stations through existing extension service machinery in promoting constructive control projects before the people of the State.

II. Transfer of functions

1. Departments now handling various forms of education and extension work are to transfer the same as soon as circumstances permit; likewise stations are to transfer regulatory functions now located with them." (690)

This plan was approved by that association and by the Association of Agricultural Colleges and the United States Department of Agriculture. It has not as yet been fully carried out by either the departments or the colleges, but there has been considerable progress in this direction and as a rule the relations between these public agencies have been very good.

Teacher-training under the Smith-Hughes Vocational Education Act

The agricultural colleges were vitally affected by the passage of the Smith-Hughes Vocational Education Act of February 23, 1917, which made permanent provision for the training of teachers of agriculture for secondary schools. While the act does not specify to what institutions the funds for this purpose shall be granted the State boards have designated the land-grant colleges in all the States. Thus the functions of these colleges in training teachers of agriculture have been greatly broadened and strengthened. The history of the movement which led to the passage of the Smith-Hughes Act and an account of its content and general operation are given in the chapter on agricultural instruction in secondary schools. (See p.883)

By 1917 departments of education were in existence in many of the land-grant institutions and there were specialists in agricultural education or distinct departments of agricultural education in a number of them. That year the Bureau of

Education reported that 40 of the agricultural colleges were offering teacher-training courses with a definite amount of professional instruction and that 841 men and 18 women had been enrolled in such courses in 1916-17. From 35 colleges 513 students with special training in agricultural education were graduated in 1916 and of this number 229 engaged in teaching or directing agricultural work in the schools.

There was much variation in the methods for teacher-training in the land-grant institutions. In the State universities part of the curriculum was offered by the college of agriculture and part by the school or department of education. Some institutions were offering two-year teacher-training curricula in agriculture but these were mainly for elementary-school teachers.

"For persons preparing to teach agriculture, some institutions offer a special curriculum quite different from the regular agricultural curriculum. Others require such persons to take the regular agricultural curriculum and elect agricultural education as their major option. Some also require prospective teachers to take the regular curriculum, with a major option in some one phase of agriculture, and to carry the necessary educational courses as elective. In some cases the regular agricultural curriculum includes all or part of the educational work required for certification. Other institutions again offer a four-year curriculum in education, with opportunity for majoring in agriculture or any other subject or subjects that the candidate expects to teach.

In general, the same results are accomplished in each case, but there seems to be a divergence of opinion with regard to whether students who are preparing to teach should be given general instruction in agriculture or specialized instruction in some phase of agriculture. As a whole, the curricula that require specialization include some work, particularly during the first two years, in the various phases of agriculture." (599)

There was considerable variation in the total number of semester hours and the proportion of time devoted to the different classes of subjects in the curriculum. The average requirements in semester hours were as follows:

Technical agriculture 49, science 40, cultural subjects 26, psychology and education 18, electives 11, total 144. The professional course usually included history and principles of education, educational administration, educational psychology and agricultural education. 32 institutions required two years of collegiate work before beginning the professional studies; 2 required three years and 6 one year.

Sixteen institutions required practical experience in farming before graduation. There were 104 instructors giving the whole or part of their time to the professional training of agricultural teachers in the 40 colleges but much remained to be done in perfecting the training of agricultural teachers, with special reference to the vocational work contemplated in the Smith-Hughes Act. A more distinctly vocational aim in the teacher-training was highly desirable, satisfactory arrangements for practice teaching were yet to be made in many States, and to a certain extent adjustment of the courses in the subject-matter departments of the colleges to meet the special needs of prospective teachers was required. The relations of the teachers of agricultural education to the subject matter teachers on the one hand and to the college departments of education on the other, called for much study and action by the administrative officers of the colleges. The ruling of the Federal Board with reference to the use of the Smith-Hughes funds for teacher training created certain difficulties in the organization and management of such work in the colleges. The board realized that prospective teachers of vocational subjects "will to a greater or less extent be taught in the usual and regular classes of the institution giving technical or pedagogical training to mixed groups of students pursuing the work with different aims, but since the purpose of the Smith-Hughes fund is 'to promote the establishment of courses and subjects having as a distinct aim the preparation of teachers of vocational subjects for service in schools and classes of the type organized under the Smith-Hughes Act', therefore the Federal funds for teacher-training may be used only for separate classes composed entirely of students preparing to teach in vocational schools and no separate classes should parallel other classes being conducted in the institution." This arrangement was difficult for the colleges to carry out. In many institutions the Smith-Hughes classes were small and their organization on a strictly separate basis was relatively expensive.

In the departments of education students pursuing other courses often desired to take the Smith-Hughes work. The agricultural and teacher-training courses in the colleges tended more largely to have vocational aims and the methods of instruction were modified to bring in the vocational elements more decidedly. In recent times the Smith-Hughes fund has been largely used for professional training of teachers, leaving the subject-matter of agriculture to be taught Smith-Hughes students in the regular college classes. However, the introduction of the teacher-training work under the Smith-Hughes Act has had considerable influence on the courses and methods of teaching in the agricultural colleges. This work has emphasized the desirability of general or basic courses in agriculture and the limitation of electives to such a group system as will keep the student close to his major interest in the planning of his curriculum. It has also created an enlarged interest in the problem method of teaching on the part of college teachers.

The agricultural colleges have been led to see that they are vitally concerned with reference to the development of agricultural instruction in the secondary schools. The teachers trained in the land-grant colleges will have much to do with the success or failure of agricultural instruction in these schools and the public will hold these colleges largely responsible for the result of the teaching of agriculture in such schools. On the other hand, through the teacher-training, the schools are brought into much closer relationships with the colleges. If the teaching of agriculture in the secondary schools is well done by teachers at the agricultural colleges not only will more graduates of the schools enter the colleges but the colleges will be able to give students at entrance more credit for their preparatory work and some of the more elementary and practical courses in agricultural subjects will be eliminated from the college course or given only to students who have not had advantages for preparation equal to those in the Smith-Hughes schools. The establishment of Smith-Hughes courses in agriculture in many

high schools has already widened the opportunities of agricultural college graduates for employment as teachers of agriculture or principals of high schools. Such teachers when successful strengthen the position of the colleges in the minds of farmers and others. Their schools become centers for the dissemination of information regarding the work of the colleges and experiment stations, as well as of improved methods of agricultural practice. Thus in another way the agricultural college is projected into the rural communities and its educational influence is more broadly felt.

The Crisis in Higher Education in 1917

In a bulletin entitled "A survey of higher education, 1916-1918", by Samuel P. Capen and Walton C. John, the Bureau of Education pointed out that an important epoch in the history of higher education closed with the year (594) 1916-17. The number of colleges and universities had decreased from 594 to 574 in the past 25 years, but 85 independent junior colleges recently organized had somewhat raised the total number of higher institutions. The distribution of collegiate institutions in different parts of the country was very uneven and their resources and the quality of their work were very variable. Between 1893 and 1916 the National annual expenditure for higher education had risen from about \$23,000,000 to over \$110,000,000 and the enrollment of students from 110,000 to 329,000.

In this period college education became far more democratic. The idea that "not only should college education be open to everybody but that nearly everybody should have it" had been widely spread but experience had shown that the real problem is the selection by liberal and democratic methods of those who would profit by higher education. The college curriculum had been greatly expanded and liberalized. Its administration under a free elective system had been developed and pushed to an extreme but a reaction had set in which is resulting in the adoption of the group system of electives.

education in this country as described by the Bureau of Education with a strong and rapidly growing organization and with marked public approbation as shown by the number of their students and the provision for expansion of their functions under the extension and vocational education acts. They are being drawn more and more into the general current of the movement for the improvement of higher education and are being impelled to cooperate with the other higher institutions in the study of educational problems and the working out of general plans which affect the interests and welfare of all colleges and universities. To them as to the other higher institutions the World War brought an unescapable crisis, followed by a new development of their activities.

The Status of the Agricultural Colleges in 1917

The status of the colleges giving instruction in agriculture in 1917 as regards their organization and their requirements for admission and graduation is set forth in a bulletin of the Bureau of Education, entitled "American Agricultural Colleges", by Dr. Chester D. Jarvis. (598) In four States the state board of education was the governing board of the college and in three States the state board of agriculture. In 23 States the governing body was called a board of trustees and in 12 States a board of regents. The number of members on the several boards varied from 4 to 41, the median number being 10. In 24 States the governor was ex-officio member of the governing board, in 25 States the superintendent of public instruction and in 13 States the president of the college or university. In 44 States the governor appointed all or a portion of the members of the board and in 4 States they were elected by the people. In only 6 States were any members of the board elected by the alumni. The term of office of board members varied from 3 years to life, the median term being 6 years.

In 17 States all higher education supported by the States was consolidated in a single university; 8 States had a single college (commonly a land-grant college); 10 States had two institutions (commonly a university and a land-grant

724

college); and 13 States had three or more State institutions. Eight States maintaining two or more institutions had a centralized board of control. "While some of the institutions are designated 'universities' and others as 'colleges' the type of organization of the latter in most cases closely resembles that of the former. In other words, the institutions with the more modest designation usually are made up of two or more major divisions, each with its dean, and fairly distinct faculty." In 37 institutions, the agricultural work was administered through three coordinate divisions - resident instruction, research, and extension. In 4 States the work was administered through the heads of the subject-matter departments. In 5 States the extension service was a department coordinate with subject-matter departments. In 2 States and in Hawaii and Porto Rico the experiment station was a separate institution. In 33 institutions the extension specialists were definitely held responsible to the subject-matter departments for the correctness of their teaching and in those institutions where the extension workers were not in the subject-matter departments it was generally understood that they would follow the recommendations of these departments in their teaching.

A standard plan of college organization recommended by the Bureau of Education and adopted by the Association of Agricultural Colleges in 1917 has already been described. (See p. 593)

Students were admitted to the regular college courses largely by certification from accredited schools, but also by examination. For admission as special or unclassified students 25 institutions required applicants to be at least 21 years of age. Only 3 colleges made admission requirements of less than 14 units but about half of the colleges lowered their standards sufficiently to admit students with one or more conditions. All the colleges prescribed for admission, English (usually 3 units), and mathematics (1 to $3\frac{1}{2}$ units); 33 required physics or other sciences (1 to 3 units); 36 required history or social science (1 to 2 units);

18 required at least one foreign language (usually 2 units); Clemson College in South Carolina required 1 unit of agriculture. The number of optional units ranged from $2\frac{1}{2}$ to 11, the median number being $6\frac{1}{2}$. The growing liberality of the colleges with reference to optional units in vocational subjects was very noticeable. In only 10 cases was the number limited to less than 4 and in about half the institutions there was practically no limit.

In 1917 graduate instruction in agriculture was offered in 44 institutions, of which 34 gave a master's degree and 10 also a degree of doctor of philosophy. All the colleges offered four-year curricula leading to a bachelor's degree, which in 40 institutions was simply designated B. S.

The opportunities in the several colleges for specialization of curricula through major options ranged from less than 5 to 22 and averaged 8. Forty-four institutions offered options in animal husbandry, 43 in agronomy, 37 in horticulture, 31 in dairy husbandry, and 25 in agricultural education. The Massachusetts Agricultural College offered an option in rural sociology, Cornell University in extension teaching, and Massachusetts and Wisconsin in agricultural journalism.

Secondary curricula, made up largely of technical work and often designated "schools of agriculture," covered 4 years in one college, 3 years in 10, 2 years in 24 and 1 year in 6. Thirty-eight colleges offered winter courses of from 10 days to five months and summer courses of from 4 to 12 weeks. Many institutions held conferences, usually called "farmers' week." Credit toward graduation was given for some of the summer courses.

The college year in all the institutions covered 36 weeks but the number of working days varied from about 194 to 216. In 40 institutions the session was divided into two semesters and in 10 into 3 terms. One hour of class work per semester or term was the credit unit. The "hour" was usually of about 50 minutes duration. "In general one credit hour implied 3 actual hours of effort on the part of the student", the distribution of this time between study, recita-

233
tation, or laboratory or field work varying with the subject or course. The minimum number of hours of class work per week for which the student was permitted to register varied from 10 to 20, the median number being 15.

The requirements for graduation, as regards the amount of work in different subjects and relations of required and elective work, were so variable that comparison of institutions on any exact basis could not be made. The total credit hours required for graduation varied from 124 to 228. The median number was 157, divided among years as follows: Freshman 41, Sophomore 41, Junior 38, Senior 37.

In a general way the percentage distribution of the subjects required for graduation for the bachelor's degree averaged as follows: Technical agriculture 36.5, pure science 24.4, applied science 6.2, social science 4.7, mathematics 2.4, foreign language 2.7, English 6.3, Electives 10.7, military and physical training 5.6.

English and mathematics were usually required in Freshman year. At least one foreign language was required in 20 institutions. ~~(See p. xxxxxx)~~ Under social science were included courses in history, civil government, economics, rural economics, sociology and education. Forty-five institutions required at least one course in social science, generally in junior or senior year. All but 3 of the colleges required some work in the technical agricultural subjects in each of the four years, and at least one course in applied science (i. e. agricultural chemistry, agricultural botany, agricultural bacteriology, plant pathology, economic entomology, etc.) All required some pure science in freshman and sophomore year, 45 in junior year and 33 in senior year. General or inorganic chemistry was required by all, usually in freshman year; botany by 47; physics by 36; geology by 39.

As a rule students select a large proportion of their elective work from among the technical courses. For this reason many of the colleges have prescribed nearly all of the non-technical work that they expect students to carry and leave a considerable proportion of the science and technical work to be elected.

The wide difference of practice with regard to the relative proportion of prescribed and elective work offered by the institutions shows that the question of freedom of election is still a matter of contention. * * * The variation in practice concerning the placement of courses within the four-year schedule suggests a disagreement among colleges concerning principles of education. * * * There is a growing belief that more technical work should be given early in the curriculum. * * * There is a tendency among certain institutions during recent years to emphasize the economic and sociological phases of the training, while others place the emphasis on technical efficiency. (598)

War Work of the Land-Grant Colleges

Before the agricultural colleges fully realized the significance of the broadening of their functions created by the Smith-Lever and Smith-Hughes acts or had perfected their organization for work under these acts, the United States entered the World War. Immediately administrative officers, teachers, research and extension workers and students connected with these institutions offered their services to the Government in such numbers that it was apparent that their educational work would be greatly crippled. The fact that these colleges had been giving military instruction under the land-grant act of 1862 greatly intensified this situation and made the Government feel that it had a special claim on both their graduates and students. In these institutions there were also a relatively large number of men trained in the application of various sciences to practical purposes and this training made them valuable for war work, outside of the strictly military field.

In its Survey of Higher Education 1916-1918, the Bureau of Education summed up the attitude of the colleges of the country, including the agricultural colleges, when the United States entered the war:

The double aspect of the present war has often been noted. On the one hand, it has been a war of science, of engineering, of medicine, of agriculture, of transportation; on the other hand, it has been a great moral struggle, in which two divergent concepts of human relationships have collided. University staffs contain men who are experts in each of the fields of science, and men also whose task it is to interpret the ethical aspects of every social movement. That these men should have read both the material and spiritual lessons developed in the three years of war in Europe, and should have sensed their import for the United States in 1917, is not to be wondered at. It would, in fact, have been surprising if they had not.

At any rate they were more ready than any other group with suggestions for the practical solution of the difficulties which confronted the Government in April, 1917. ^

In the autumn of 1916 Congress had created the Council of National Defense, consisting of the Secretaries of War, Navy, Interior, Agriculture, Commerce and Labor. Primarily it was the function of this council to investigate the resources of the country with reference to their utilization in war. "Associated with the Council was an advisory commission composed of seven civilians expert in the fields of transportation, munitions, supplies, raw materials, engineering, labor, and medicine." The commission secured the aid of committees of experts in the conduct of investigations and the formulation of policies. Originally education was not included in the council's activities. But soon after the United States declared war the Commissioner of Engineering of the advisory commission was asked to investigate and report on the problems of education related to the war. He appointed a committee and called a meeting of representatives of the principal associations of colleges and universities at Washington, May 5, 1917. This was attended by official representatives of 5 associations, including the Association of American Agricultural Colleges and Experiment Stations, and by officers of 187 higher institutions.

The attitude of the conference was expressed in the following preamble to their statement of principles:

In the supreme crisis that confronts the Nation the colleges and universities of America have the single-minded thought and desire to summon to the country's service every resource at their command, to offer to the Nation their full strength without reservation, and to consecrate their every power to the high task of securing for all mankind those ideas and ideals that gave them birth and out of which have grown their most precious traditions. (594)

In the statement they urged that qualified young men below draft age and those not recommended for special service should prepare themselves in the colleges for the most effective service both during the full period of the war and in the trying times which will follow its close; that the colleges should modify their calendars and curricula to meet the war conditions; that students

pursuing technical courses, such as medicine, agriculture, and engineering, should continue their training; and that the colleges should "disseminate correct information concerning the issues involved in the war and to interpret its meaning." A permanent committee was appointed to work with the advisory commission of the Council of National Defense. On this committee the land-grant institutions wererepresented by Presidents Benton of Vermont, Butterfield of Massachusetts, Pearson of Iowa, Stone of Indiana, and Thompson of Ohio. The land-grant colleges not only strengthened their military training as far as possible, but also established various emergency courses, among which were those relating to the production and conservation of food. President Wilson put the influence of the Government behind the effort of the colleges to retain their students and keep their work going in an effective way. But the exodus into military service continued. The records of the Bureau of Education show that in 38 agricultural colleges the number of students declined from 11,799 in 1916 to 7,680 in 1917; in 8 veterinary colleges from 525 to 348; and in 6 forestry schools from 484 to 236.

As the war proceeded it became apparent that more definite and drastic measures must be taken to conserve the supply of experts and of military officers. After much discussion within and outside the War Department, the Secretary of War on February 10, 1918, created the committee on education and special training, consisting of 3 military officers, to function under the direction of the Chief of Staff, as follows:

To study the needs of the various branches of the service for skilled men and technicians; to determine how such needs shall be met, whether by selective draft, special training in educational institutions, or otherwise; to secure the cooperation of the educational institutions of the country and to represent the War Department in its relations with such institutions; to administer such plan of special training in colleges and schools as may be adopted. (594)

An advisory civilian board of five (afterwards seven) members was also appointed. Dr. C. R. Mann, of the Carnegie Foundation for the Advancement of Teaching, was chairman and representative of engineering education; President Pearson of the Iowa State College represented agricultural education. The committee at once secured estimates from the staff corps as to the needs of the Army for technically trained men and then established 147 training centers for technicians, of which 123 were at engineering schools. Some 47 of the principal Army occupations were taught soldiers in these so-called National Army Training Detachments. In these intensive and practical courses under military discipline and with the compelling motives induced by the war surprisingly rapid progress was made by the students. Job analysis and the devising of special methods of teaching to bring about the desired training were emphasized in this work. The importance of having the student understand his relations to the war was also brought to light and led to the introduction of weekly discussions on the war aims of the United States.

These discussions were designed to cover the historical background of the war, the economic and social development, and the types of government of the belligerent countries; and to acquaint the soldier with the expression of different national purposes and philosophies, as these have found their way into literature. (594)

The committee next considered the more difficult and complicated problem of keeping students in colleges and getting them ready for efficient military service. This resulted in the Students Army Training Corps, which was at first intended to be a voluntary organization of students over 18 years of age, enlisted in the army but kept in military training at the college until they reached the age of 21. The intention was "to leave full liberty of action to college officers, in the development of courses and in the conduct of the institutions. Before this plan had gone into effect the military situation became so serious that Congress lowered the draft age to 18 years and created the necessity for a greatly increased number of officers in the Army. The Students' Army Training Corps

was made an active military unit under orders from the President and the colleges virtually came under control of the War Department, though college officers were to a certain extent responsible for the academic work of the corps. This plan put into operation with the beginning of the college year 1918-19 lasted only six weeks, and was largely rendered useless by the influenza epidemic of that year and the ending of the war. The plan had serious defects and created much friction in the colleges but it united the higher educational institutions of the country in a common purpose and kept them intact so that they emerged from the war in comparatively normal condition.

The Committee on Instruction in Agriculture summarized the war work of the agricultural colleges in its report to the Association of Agricultural Colleges in January 1919, from which the following statements are taken:

Many of the younger men went directly into military service, many others into federal service in positions created by the war emergency and many into war industries to take positions for which by training and education they were specially fitted. Of those resident teachers who remained at the colleges, many transferred to the extension divisions and nearly all devoted a considerable part of their time to extension work. College presidents, deans, station directors and specialists volunteered for work in the United States Food Administration or the United States Department of Agriculture in Washington or became food administrators, or members of food commissions, state defense councils or other emergency organizations at home. There was much shifting of places but no shortening of hours of labor.

As to the shortening of the college year, there was considerable variation in practice. Several of the Agricultural Colleges made arrangements immediately after the declaration of war to close earlier than usual, while 10 institutions made early plans for a shorter scholastic year in 1917-18 by eliminating vacations and, in some cases, midyear examinations. Apparently, however, only seven colleges actually decreased the number of sessions in the college year.

In some cases the need for young men to work on farms was met in other ways. In Idaho and Minnesota, for example, "concentration courses" were organized. This arrangement permitted students who wished to leave college at the beginning of the growing season to devote double time to half the usual schedule and thus complete their reduced schedule in the middle of the second semester.

When war was declared in April, 1917, agricultural college students everywhere began leaving for military service, or for equally useful agricultural service in the extension organizations or on farms. Immediately questions concerning credit for college work began to arise. There was no time for long-drawn considerations. About half of the Agricultural Colleges met the issue promptly by permitting students to withdraw with credit for military service, for approved agricultural work, or for approved industrial work.

In some cases only seniors in good standing were permitted to withdraw with full credit, and in other cases full credit was withheld from all except seniors entering military service.

134

In general it may be said of existing courses carrying college credit that they were changed but little except in the direction of shortening some of them as indicated earlier in this report and of intensifying their application to the war program, to the production and conservation of food. (723)

Only a few new college credit courses in agriculture were conducted. These included courses for the preparation of garden supervisors in Connecticut and Massachusetts; in hippology or horse management in Indiana and Oregon; in the storing and utilization of perishable crops in Missouri and New York. There were also emergency courses for the preparation of teachers and extension workers. The short courses in farm practice, particularly in the winter, were emphasized. Special training in the operation of tractors was given in a number of States.

The industrial work of the Agricultural Colleges called for less revision to meet the war emergency than that of any other class of higher educational institutions. For years they had been teaching food production, farm management, veterinary practice, military tactics, and the sciences related to these practices. A little more emphasis on the production of grains for human food, a little on modifications in crop rotations and in farm practices to meet the labor and fertilizer shortages, a few additions to the special courses and short courses relating to these changed conditions and on the more general use of farm power machinery - these were about the only modifications in the college instruction in agriculture. (723)

The greatest and most wide-spread work of the agricultural colleges during the war was in the extension field. With the active cooperation of the United States Department of Agriculture through its States Relations Service, and with the aid of about \$11,000,000 added to the regular extension appropriations by Congress, for the stimulation of agricultural production and the conservation of food, the extension organization was very rapidly expanded until there were agricultural agents in over 2,400 counties, home demonstration agents in 1,700 counties and 200 cities, and an enrollment of 2,000,000 in the boys' and girls' clubs. A large force of specialists in the various branches of agriculture and home economics were also employed in the several States.

At the close of the war about 7,000 men and women were employed in the extension work. To cooperate in carrying on this work organizations of farming people, commonly called farm bureaus, were created in about 1,500 counties with

a membership of over 1,000,000 persons and there was also much cooperation with the Grange, Farmers' Union and other existing farm organizations. Through the extension agents and the farm organizations, agricultural production and food conservation were greatly stimulated. Information regarding the aims and policies of the Government in the conduct of the war was widely diffused among the farming people through the extension agencies and much knowledge of the views of these people and of the status, results and needs of agriculture in different parts of the country was brought to the Government at Washington.

The agricultural colleges had a part in the unique educational enterprise undertaken in 1919 for the benefit of the American soldiers in France. This was planned and inaugurated by the Y. M. C. A. and afterwards was taken over by the Army Education Commission. Part of this plan was the establishment of an organization for instruction in agriculture. This college of agriculture was located at Beaune in east central France and enrolled 6,000 students, and 2,600 more at a nearby farm school at Allery. Through a system of extension work these courses in agriculture were carried to thousands of soldiers so that in practically every regiment some sort of agricultural instruction was given, through a school, institute, short course, farmers' club, special lectures or correspondence courses. The work was in charge of President K. L. Butterfield of the Massachusetts Agricultural College, with whom were associated a large number of the ablest agricultural educators from the colleges throughout the United States and more than 150 were selected from the army, representing 40 agricultural colleges. Forty different studies were offered, grouped under agronomy, horticulture, and forestry, animal husbandry, and rural economics and sociology. Numerous trips to French farms and forests supplemented the classroom work.

The agricultural colleges also had a large share in the rehabilitation of soldiers injured in the war. This work was under the general supervision of the Federal Board for Vocational Education until 1921, when it was transferred to the Veterans' Bureau. Practically all the agricultural colleges and many secondary agricultural schools were used for the instruction in agriculture. The number of such students in agriculture reached its peak in 1921 when 15,000 were enrolled. The following year there were 11,000, of whom about 2,000 were in the degree courses, 4,000 in practical courses of the unit or two-year type, and 5,000 in special short courses.

land-grant
Post-war work of the ~~agricultural~~ colleges

For two years after the close of the war there was a great increase in the number of students of agriculture in the colleges due to the return of students whose courses had been interrupted by the war, the rehabilitation work, and the general prosperity of the farmers.

In 1918-19 in the 48 State colleges for white students 9,890 men and 455 women were enrolled in the four-year agricultural courses. In 1919-20 there were 14,750 men and 612 women and in 1920-21, 14,679 men and 487 women. In graduate courses there were 256 men and 32 women in 1918 as compared with 744 men and 37 women in 1919 and 751 men and 71 women in 1920. The number of students receiving degrees in 1919 was 1,133 men and 94 women, and in 1920 2,209 men and 87 women. In 1921 2,417 men and 44 women were given bachelor degrees and 195 students were given advanced degrees. There were also 14,997 men and 1,996 women in subcollegiate work, including short courses, summer schools and correspondence courses.

In 1922 the bachelor's degree was given to 2,339 agricultural students. At 32 institutions 265 students received the master's degree for work in agriculture, including 44 at the Iowa State College, 39 at the University of Wisconsin, 23 at Cornell University, and 22 at the University of California. For more advanced work 42 students received the doctor's degree at 8 institutions, including 16 at the

University of Minnesota, and 13 at the University of Wisconsin.

For some time after the war the colleges experienced great difficulties in getting properly trained teachers to meet the increased demand for agricultural instruction. Many teachers who had been in war service, as well as young graduates who might have become teachers, found more profitable employment in farming or other industries. The salaries for county agents and other extension workers and for agricultural teachers in the secondary schools were in many cases higher than those of college teachers.

Apparently the colleges first met the new situation by increasing the work of their teachers, who were obliged to deal with larger classes of students. In 1918 the teachers of agriculture in the State colleges numbered 1,777 men and 98 women but actually decreased in 1919 to 1,627 men and 53 women. In 1920, however, there were 2,032 men and 96 women. This increase was partly due to advances of salary but more generally to lowering somewhat the standard of qualification for college teachers.

The income of the land-grant colleges for instruction and administration increased from \$41,500,000 in 1919 to \$55,200,000 in 1920 and \$66,500,000 in 1921. A goodly share of this increase was devoted to agricultural instruction, including the erection of many substantial buildings, and much equipment in apparatus, libraries, live stock, and farm machinery. The organization of the land-grant institutions is so varied and complex that it is impracticable to determine exactly how much of their income is spent on agricultural instruction. It is, however, estimated that this amounted from 1920 to 1925 to about \$10,000,000 annually.

The establishment of departments of education in all the land-grant colleges and universities brought them into the general movement for the standardization of the organization, curricula and instruction of institutions for higher learning.

The recent studies in educational psychology showed the importance of dealing with students on the basis of their individual ability and cast much doubt on the so-called disciplinary value of what had been generally considered necessary and fundamental branches of knowledge in school and college curricula. The invention and wide use of intelligence tests, the experiments with the problem method of teaching, and the growing complexity of the college programs brought college authorities and teachers to the realization that teaching was becoming a more severely technical profession. It was no longer considered enough that the college teacher have a thorough knowledge of his subject. He must also know the best method of giving instruction and take into account the varied mental ability and attitude of his students. The effort of the agricultural colleges to train teachers of agriculture for the secondary schools inevitably brought discussion and criticism of the college teaching of this subject. Many questions arose regarding the content of the college curriculum in agriculture, the order of the presentation of subjects and the methods of teaching.

The economic depression of agriculture which began in 1921 brought peculiar problems and intensified the desirability of more careful and thorough attention to the needs of college teaching of agriculture. The number of students began to decrease because they could not see a prospect of profitable employment in agriculture. It therefore became necessary for the colleges to study the vocational outlets for their students and to increase their courses which prepared for various special pursuits in which a knowledge of agriculture was necessary or desirable. The great demand for the teaching of rural economics, together with a definite call for instruction in rural sociology, agricultural pedagogy, and extension work, necessitated the readjustment of the curriculum to include matters relating to these subjects. The individual colleges, therefore, from 1920 to 1925, made many studies and experiments covering various phases of their curricula and teaching. Accounts of this work largely occupied the attention of the Association of Land-Grant Colleges, which also made efforts to collate

the results and suggest ways for their general utilization. The Bureau of Education and the States Relations Service of the Department of Agriculture cooperated with the colleges in studies along these lines.

In the 51 land-grant colleges (including those in Alaska, Hawaii and Porto Rico) in 1922-23 there were 13,502 men and women in the four-year courses in agriculture, besides 588 in forestry and 525 in veterinary medicine. In 1923 in these colleges 2,413 men and 121 women were given the bachelor's degree in agriculture; 294 students in agriculture received the master's degree and 40 the doctor's degree. There were 75 graduates in forestry and 140 in veterinary medicine.

Change in the Name and Organization of the Association of American Agricultural Colleges and Experiment Stations

In the course of its development the Association of American Agricultural Colleges and Experiment Stations had become essentially an association of the colleges and universities receiving the benefits of the land-grant act of Connecticut, Georgia, 1862 and supplementary Federal legislation. Only in New York and Ohio were there agricultural experiment stations receiving Federal funds, which were entirely independent of these colleges. For a considerable period the interest of the association had been chiefly centered on the problems connected with agricultural education and research. In recent years the growth of interest in extension work, engineering and home economics had brought about changes in the constitution and organization of the association which made it a complex organization and raised troublesome questions regarding the responsibilities and privileges of the representatives of the institutions who attended its meetings and took part in its affairs. The voting delegates might be presidents or deans or their representatives and the directors of both the independent and dependent experiment stations, as well as representatives of the United States Department of Agriculture, the Office of Experiment Stations and the Bureau of Education.

As amended in 1912 the constitution of the association divided it into three sections, (1) on college work and administration, (2) experiment station work, and (3) extension work. The voting members of these sections were (1) the presidents or acting presidents of the colleges and universities, (2) the directors or acting directors of experiment stations, and (3) directors or superintendents of extension departments of the institutions represented in the association. These voting members might, however, be represented by duly accredited proxies. Only members of the sections were entitled to vote in general or sectional sessions and "no action on public and administrative questions shall be final without the assent" of the section on college work and administration. No action of a section was valid until ratified by the association in general session. Each section was empowered to "create such divisions as it may from time to time find desirable." When the representatives of the engineering and home economics departments of the colleges sought admission to the association divisions were created for them in the section on college work and administration. This arrangement was not very satisfactory because these departments were interested in research and extension work, as well as in college teaching and administration, and they felt humiliated by not having voting privileges in the association. They also objected to the name of the association as leaving them out of account. The feeling that the name was not right, had often involved the association in much unprofitable discussion without result. On the other hand, the presidents of the colleges and universities found increasing embarrassment because of action taken from time to time in the association in which the votes of representatives of the stations and extension departments had been cast so as to counteract their own votes, thus making for administrative confusion. The enlarged functions of the colleges growing out of the Smith-Lever and Smith-Hughes Acts increased their apprehension because the interpretation and administration of these acts involved many new problems of relationships within and without the institutions.

This matter came to a head in connection with the meeting of the association held at Baltimore in January 1919. (635) The presidents of the land-grant institutions held a meeting and formulated a statement, which was presented to the association by President W. E. Stone of Purdue University. In this statement it was pointed out that "the present form of organization has become too complex; that it is no longer well adapted to the needs of the land-grant colleges as a whole." Originally intended to secure "unity of action on all matters pertaining to the common aims of the institutions in their relations with the Government and the public,"

it is apparent that it no longer represents the varied interests of the Colleges or meets the fundamental need for deliberation and action upon questions of institutional administration and policy. The annual meetings bring out an attendance too large, too varied in its interests, and too limited in authority to secure careful discussion and responsible action on questions vital to the welfare of the Land-Grant Colleges.

The present organization of the Association provides no place for many important interests in the Land-Grant Colleges. Were it to do so, however, it would only increase the present confusion and difficulties as regards careful discussion and action on institutional affairs as a whole; the organization separates authority from responsibility; the very name of the Association is indicative of its one-sidedness. (635)

To fix responsibility for legislation relating to the policies and administration of the colleges and to retain sectional meetings for the discussion of matters pertaining to the working of the various departments of the colleges a reorganization of the association was recommended as follows:

1. The name to be The Association of Land-Grant Colleges.
2. The legislative functions of the Association to be lodged with the Presidents of the Land-Grant Colleges belonging to the Association.
3. The retention of sections as at present for discussion and for recommendation and report to the legislative body of the Association.

After discussion the Association accepted "the principle involved in this report" and provided for a committee of nine members to report a plan for carrying the purpose of the report into effect. This committee reported definite amendments to the constitution at the Baltimore meeting, which under the constitution went over to the meeting at Chicago in November, 1919. The amendments were there discussed at considerable length and were adopted with a number of changes. The most

important changes, suggested by Dean Alfred Vivian of Ohio, created a section of agriculture in the place of sections of agricultural experiment stations and agricultural extension, made representatives of the Department of Agriculture and Bureau of Education members of the sections, provided definitely for general sessions and gave members of the sections a vote both in general sessions and in their respective sections. The legislative branch of the association was designated "the executive body", to consist of the presidents or executive officers of the institutions having membership in the Association. The officers and executive committee of the association were to be chosen by the executive body but each section was to elect its chairman and secretary. Sections of agriculture, engineering and home economics were expressly provided for in the constitution. When the section of agriculture was organized in 1920, provision was made for subsections of resident teaching, experiment station work, and extension service to be established.

The broadened interest of the association in vocational education was shown at the meeting in January, 1919, when the standing Committee on Instruction in Agriculture was changed to a Committee on Instruction in Agriculture, Home Economics
Mechanic Arts
and ~~Trades and Industries~~ and its membership was increased from 6 to 10, including three representatives of agriculture, home economics and mechanic arts respectively, in addition to the chairman.

Efforts to Improve Curricula

In the period following the World War there has been a general desire of American Colleges to meet the new educational situation by improving their curricula. The agricultural colleges have shared in this movement. In January, 1919, the United States Commissioner of Education, Dr. P. P. Claxton, called a conference of representatives of agricultural education to advise him concerning a program of agricultural instruction to meet present needs. At this meeting a subcommittee on college instruction in agriculture was appointed. Representatives of this subcommittee visited

20 of the agricultural colleges located in the different agricultural regions of the United States. Conferences were held with deans and members of the faculties individually and collectively and in some cases with groups of students. The report made in 1920 as the result of these conferences contained the following statement regarding the attitude of the colleges toward the movement for the improvement of curricula:

It was discovered that practically all the colleges were more or less actively considering problems of their curriculum, through special faculty committees or otherwise. Modifications of the curriculum had either been recently adopted or were under consideration; entrance requirements were either changed or being seriously scrutinized; readjustments of the elective system were being made or discussed. There was also a general purpose to improve the quality of college teaching and the equipment for this work. This movement was being affected by various influences. Among these were: (1) A desire to make sure that the institution would be fully of standard college grade; (2) to train students to meet more practically and fully the requirements of the particular pursuits for which they were preparing; (3) to meet new conditions in the secondary schools, especially those due to the introduction there of vocational studies, in order that the college might improve and strengthen its relations with the preparatory schools; (4) to take into account the new pedagogical theories relating to the mental fitness of students to pursue college courses, the educational value of different studies as related to the objective of the student; the problem method of instruction, as related to the logical method, etc.; (5) the scope of limitations of practicums, field practice, visual instruction, lectures, textbooks, etc.; (6) new views of educators regarding the development of instruction in the fundamental and related sciences out of courses in practical agriculture so constituted as to create a desire in the student to know underlying facts and principles and to lead him on to studies of the sciences, rather than by beginning with sciences and basing instruction in agriculture on the scientific facts and principles previously acquired by the student; (7) the broadening of the agricultural curriculum to include not only agricultural production but also rural economics and sociology, and, for certain students, pedagogical training. (613)

As the result of the study of the agricultural college curricula made for the Bureau of Education and published in 1921, Prof. Carl R. Woodward of Rutgers College, summarized "the fundamental principles underlying the curriculum, as applying to average conditions, as follows:

- (1) A normal credit requirement would be 20 credit hours a semester, or a total of 160 for graduation.
- (2) The distribution of types of work should be about as follows:
Academic, 21 percent; scientific, 27 percent; general agriculture, 26 percent; special agriculture, 14 percent; total agriculture, 40 percent; elective, 12 percent.
- (3) The proportion of required work should be about as follows:
Required, 62 percent; prescribed elective, 26 percent; free elective, 12 percent.

- (4) The work of the first year should be predominantly of the academic and scientific types, forming a foundation for the advanced work in agriculture to follow.
- (5) Some academic work should be given each year in order to fulfill the cultural aim, and in order to develop a broad point of view within the student as he progresses toward the completion of his course.
- (6) Some work in agriculture should be given in the first year, in order to give the student the agricultural viewpoint as soon as possible, and should follow in increasing proportions throughout the four years.
- (7) All work in the first year should be required. Some election may be allowed in the second year, but most election should be left until the third ~~er~~ and fourth years.
- (8) During the first and second years, courses covering the fundamental principles of agricultural science should be required in order to form a basis for the technical training to follow.
- (9) Elementary courses in the main branches of agriculture should be required in the first two years in order to form a foundation for specialized study and to give the student a wide outlook on the field of agriculture and an unprejudiced view of its different phases, so that he may make his choice of special work intelligently.
- (10) Specialization should commence at the beginning of the third year.
- (11) The best method of offering specialization is the department or group, in which a student elects his special work by choosing a definitely outlined course of studies arranged to fit for the field in question with an allowance for a small amount of free election.
- (12) A minimum of six months of farm practice, completed before the fourth year, preferably before the third year, and better still before matriculation, should be required.
- (13) Certain subjects should be required in all curricula; others are desirable and in most cases should be included, but because of local conditions may be left out. These are indicated, respectively as Groups A and B.

Group A

First year:

English
 Physical or military training
 General chemistry
 Botany
 Types and breeds of farm
 animals

Second year:

Public speaking
 Qualitative chemistry
 Zoology
 Organic chemistry
 Soils and soil management
 Farm machinery
 Dairy production
 Poultry husbandry
 Field crops
 Fruit growing

Group B

First year:

Algebra
 Trigonometry
 Farm shop

Second year:

Physics
 Vegetable gardening

Third year:
Bacteriology
Entomology
Economics

Third year:
History
Feeds and feeding
Soil fertility

Fourth year:
Farm management
Rural Economics

Fourth year:
Rural sociology

- (14) Foreign language should be required only of students who have not had at least two years in preparatory school and of those who are preparing for teaching or research.
- (15) The curriculum should be shaped to meet local conditions in the State and at the college. (727)

The need of a more thorough and comprehensive study of the problems of the curriculum was brought out at the meeting of the Association of Land-Grant Colleges in 1922 in a paper by Dean A. R. Mann of the New York College of Agriculture on the determination of the aims and organization of the courses of study in an agricultural college. This was based on an outline of an analysis of the problem worked out by the department of rural education in that college, as follows:

In a full diagnosis of the matter, five phases of the general problem may be discussed: (1) The determination of the major aims, or objectives, of the college, as a prerequisite to curriculum making. (2) A study of the situations to be met within the several divisions of the general field, or in the successful discharge of the duties which each of the major aims imposes on the individual. (3) The determination of the organization of curricula which will best prepare students to meet the situations or discharge the duties in each of the divisions of the general field. (4) The determination of the content and the organization of the several subject courses of instruction offered by the departments. (5) The determination of the methods of teaching appropriate to the respective courses.

A faculty must organize itself for such a study. This will doubtless involve the designation of a series of committees, including, first, a central, or administrative, committee, to determine the scope of the study to direct its conduct, and to finally review, harmonize, and report the findings of sub-committees charged with the investigation of the divisions of the general problem. A wise faculty will not be limited to its own membership or be bound by any considerations of personal prestige in the selection of committee members. Success will be wholly dependent on the qualifications of the individuals for the parts assigned them, and on their readiness to do the work. (680)

The subcommittee on college instruction in agriculture in the report above referred to, stated the objectives of the agricultural colleges as follows.

- (a) The general aim of the agricultural college should be to prepare students to live in a rural community and work in agriculture or to work in the interests of agriculture and rural life, wherever they might live.
- (b) The particular objectives of the individual college will vary with its environment, clientage, and resources, but may include training for the following pursuits in the agricultural field:
1. General or mixed farming
 2. Special farming, such as seed growing, truck growing, orchard management, greenhouse management, animal breeding (beef cattle, hogs, horses, etc.), dairy production, poultry production.
 3. Teaching in colleges or schools, extension work, county agent work, journalism.
 4. Research, as experiment-station work.
 5. Administrative and regulatory work.

These colleges generally accept this statement of objectives as representing very well their view of this matter. In California it was suggested that the training of specialists in agricultural chemistry, entomology, plant and animal pathology, and other sciences related to agriculture should be included in the objectives of the agricultural college whether students in those branches intended to engage in agricultural work or not. (613)

Dean Vivian of the Ohio College of Agriculture in a paper before the Association of Land-Grant Colleges in 1921 summarized the major aims of the agricultural college as follows:

* * * the one great aim of all agricultural education, of whatever grade, is to hasten the day when there will be a prosperous, happy, contented, intelligent family living in every farm home.

The college can assist in this program:

- (1) By preparing scientifically trained, practical farmers, who will be outstanding leaders in their communities, and who will by their example "leaven the whole lump."
- (2) By preparing researchers for the experiment stations and the United States Department of Agriculture, who will approach these problems with a keen scientific spirit and with broad agricultural sympathy and understanding.
- (3) By training teachers for colleges, secondary schools, and extension service who will be well-grounded in agriculture and teaching methods, and above all, who will have the right point of view, will be fitted with a keen appreciation of country life, and imbued with a genuine sympathy with the problems of the farm and the farm home. (721)

In the movement to improve the agricultural curricula during this period there was a strong tendency to limit early specialization. At the same time an effort was made to satisfy the reasonable demands of students who were looking forward to entering a greater variety of pursuits. This led to the offering of special courses not only for the principal branches of agricultural production

but also in rural engineering, rural economics, rural sociology, agricultural education and agricultural extension. Here and there new courses were organized to meet the requirements of various professional groups. For example, the New York College offered courses for fertilizer salesman, poultry judges and beekeepers; the Wisconsin College, for boys' and girls' club leaders and county agents; the Massachusetts College, for salesmanship of agricultural products, advertising agricultural products, rural social surveys, horticultural manufactures.

There was a growing belief that while instruction in some of the sciences underlying agriculture, particularly physics, chemistry, botany and biology, early in the college course was very desirable, teachers of these subjects should have the agricultural point of view and shape their courses to meet the real needs of agricultural students rather than to follow the traditional plan of developing their subjects logically and with the idea that the students were to become specialists in these sciences. This view was expressed, for example, by Dean Davenport of the Illinois College of Agriculture, in a discussion of fundamental courses in science for agricultural students at the meeting of the Land-Grant College Association in 1920. "In the sciences," he said, "we have yet to work out good elemental courses. The tendency is to drag too much of specialization into the beginning courses. * * * These non-technical courses should be taught in the college of agriculture, and with special reference to the needs of the agricultural student."⁽⁶³⁵⁾^

At the same meeting Professor H. F. Cotterman of the University of Maryland, as the result of a broad study of required courses for the bachelor's degree, found a general feeling in the colleges that agricultural students seeking this degree should be required to take one or two courses in farm crops, soils, horticulture, animal husbandry, dairying, farm equipment, and farm management and present at least the equivalent of a year's practical experience on a farm.

The results of a study in curriculum making by the faculty of the Ohio College of Agriculture were presented to the Land-Grant College Association in 1923 by Dean Vivian. While realizing the need of more thorough analysis of the problems involved in curriculum construction the Ohio faculty decided to adopt the following procedure in making the general agricultural curriculum:

- (1) To limit the amount of the basic natural sciences, economics, and other so-called "arta" subjects to the least amount which is necessary to give the student the foundation for his technical courses.
- (2) To require one course one quarter in length in each technical department in order to give the student a general view of the field of agriculture, these courses to be general in nature and as practical as possible.
- (3) To concentrate the work into short units so that the student will carry only three or four subjects at a time. The faculty finally decided to recognize only three-hour and five-hour units. Three five-hour subjects constitute the normal load.
- (4) To require each student to choose one major subject on which he will spend at least three quarters.
- (5) To limit the amount of undergraduate specialization on the part of the over-zealous student by limiting the number of hours he may take in one department for undergraduate credit.
- (6) To allow the maximum possible number of hours of election so that he may prepare for any of 109 or more occupations followed by agricultural graduates.
- (7) To provide him with an advisor when he chooses his major so that he may be assisted in selecting the subjects which will best prepare him for his objective.
- (8) To make the curriculum as flexible as possible by allowing considerable latitude in the sequence of courses, and to repeat the courses in the quarters so that a student may enter at any quarter, drop out for a quarter or two as frequently as necessary, and graduate in any combination of twelve quarters, or less if he has made a record which entitles him to carry an extra load.
- (9) To permit a reasonable amount of election of general informational subjects outside the college of agriculture in case the student desires it.
- (10) To make a limited number of agricultural subjects available in the first year for the psychological effect upon the freshman.
- (11) To assist the freshman in orienting himself by means of a series of lectures by the dean and members of the faculty describing in a general way the various lines of work in order to assist the student in selecting his major, as well as to give him a comprehensive view of the field of agriculture.
- (12) Farm experience to be required before entrance upon the junior year. (720)

The economic depression in agriculture beginning in 1920 brought urgent demands from various sources, including important farm organizations like the American Farm Bureau Federation, that the colleges should give more attention to the teaching of economics, with special reference to agricultural problems. The colleges had great difficulty in satisfying this demand partly because the knowledge of this subject had been only partially reduced to pedagogical form and partly because

there were few trained teachers of this subject. The great interest in this matter in the colleges was illustrated by the discussion of the role of economics in the training of agricultural students by Prof. B. H. Hibbard of the Wisconsin College of Agriculture and Dr. Henry C. Taylor, Chief of the Bureau of Agricultural Economics of the United States Department of Agriculture at the meeting of the Land-Grant College Association in 1923. Professor Hibbard pointed out that the organization of work in agricultural economics had been most successfully accomplished when it was a separate subject in the college of agriculture, rather than a part of the general department of economics in a college of letters and science, or distributed among several departments dealing with agricultural production. Dr. Taylor thought that in the four-year agricultural curriculum there should be required courses in general and agricultural economics and elective courses in different branches of agricultural economics. At the Massachusetts Agricultural College there was a division of rural social science with a curriculum of required and elective courses in rural economics and sociology. (See also p. 764)

There has in recent years been a growing appreciation that such studies as rural economics and sociology have not only practical importance but also a large measure of cultural value since they are essentially in the field of the "humanities". This was well brought out by Dr. A. Ross Hill, formerly president

of the University of Missouri, in a paper on "The contribution of land-grant colleges to liberal culture" at the meeting of the Land-Grant College Association in 1923, as follows:

* * * the classics have ceased to hold the place they once did, because of the rise of modern subjects that aim to explore human life in the present and reveal to the student his social world, to broaden his sympathies, and to quicken and give direction to his moral impulses. To this end such subjects as rural economics and rural sociology make admirable supplements to the technical courses in agriculture. And this is liberal culture: To be possessed of insight into and appreciation of modern civilization and to be responsive to its claims upon one. (671)

The spread and improvement of instruction in agriculture in the secondary schools and the consequent giving of entrance credits for this subject by the colleges has had the effect of breaking down the insistence on at least one foreign language as a prerequisite for entrance to the college course in agriculture in the land-grant colleges. In 1924 the Committee on Instruction in Agriculture found that "only five of these colleges now hold to a rigid foreign language requirement for students in agriculture."

It has been seen that in the development of the four-year agricultural curricula the colleges have generally come to the conclusion that some agriculture should be taught in freshman year. This has been done partly "to give the student early in his course a good understanding of what is involved in education for agriculture and rural life and prepare him to choose and pursue intelligently his course later on," and partly "to arouse and stimulate his interest in agriculture and lead him to relate the agricultural subjects more definitely and usefully with the knowledge derived from a study of the sciences related to agriculture." The sub-committee on college instruction in agriculture found in 1920 that a practical compromise had been generally made between the theories that instruction in the fundamental sciences should precede the study of agricultural subjects and that the students should first deal with concrete things and make their practical knowledge of such things a basis for the study of the sciences.

In most colleges the teaching of some agriculture has been brought down to freshman year, and during the first two years a considerable amount of instruction in the main branches of plant and animal production is required of all agricultural students. During the same period courses in several of the sciences run parallel with those in agriculture.

Of late, basic courses in agriculture have come to have added significance and importance in connection with the training of teachers of agriculture for secondary schools and extension workers in general agricultural lines, who need broad general training in agriculture rather than specialization in one or two phases of the subject. Those in charge of teacher-training work in the agricultural colleges are quite generally agreed that basic courses in agronomy, animal husbandry, rural engineering, and rural economics are essential to best results in their field. They point out that where basic courses are lacking it is sometimes necessary for a student to take 12 to 15 semester hours in a department in order to get even a superficial view of its subject matter, and that when the work of six or seven departments is so organized, it is manifestly impossible for prospective teachers to get the kind of training they need. (613)

The colleges were quite generally agreed "that during the first two years in college students should be required to take general basic courses, which should include what the general farmer needs to know in order to carry forward work intelligently and successfully." There was, however, a lack of clear understanding regarding the essentials of such courses. The desire of the different subject-matter departments to be represented in these courses often led to too much specialization and too much detailed instruction in certain subjects. Thus some institutions would give courses in agronomy, animal husbandry, horticulture and farm mechanics, while others would add to these courses in genetics, farm motors, farm carpentry, forging, vegetable gardening, etc. To remedy this, at least in part, some institutions developed a brief survey course for freshmen.

The subcommittee reached the following conclusion regarding basic courses:

The plan now generally followed of having basic courses in each of a considerable number of departments and spreading those courses over two years does not fully meet the need of the student who has not had a good course in agriculture in the secondary school to get a fairly good view of the general content of agriculture quite early in his course. This difficulty may perhaps be largely removed by having the basic courses in soils, crops, and animal husbandry somewhat broadly drawn and required in freshman year.

An example of a course in crops framed on this plan is that given to freshmen at the Illinois College by Prof. Burlison. This course is based on the discussion of a few type crops, including cereals, legumes, and potatoes. Among the subjects treated are preparation of the seed bed, seed selection, judging, grading, improvement of varieties, weeds, insects, diseases, harvesting, storing, marketing, and cost of production.

These basic courses, together with the elementary courses in the more specialized subjects, such as horticulture, poultry, rural engineering, etc., might be spread over freshman and sophomore years. In this way a sufficient basis of general instruction in agriculture would be laid on which to build specialization through group courses beginning in junior year. (613)

While there has been a general tendency in recent years to adopt the group system of electives agreement has not been reached regarding the best way to administer this system. Usually the student has been expected to take as his major subject one of the main divisions of agriculture as agronomy, horticulture, animal husbandry, dairying, agricultural engineering, or rural economics. But often the student desires to specialize on some subdivisions of these subjects. Care has to be taken lest this specialization go too far and deprive the student of the broader training required for full appreciation of his chosen subject. Thus the student in the animal husbandry or horticultural group may not get enough of rural economics to understand the problems of economic production or marketing and on the other hand the student of rural economics may not get enough regarding agronomy or animal husbandry to understand the proper relation of production to marketing or other economic phases of agriculture. Studies of agricultural curricula in recent years have indicated that if there is to be liberal as well as practical education relating to agriculture and country life, the agricultural curriculum must be extended down into the secondary schools as is proposed and actually begun under the Smith-Hughes Act and up into graduate courses for those fitting themselves for professional or special lines of agricultural service. This would enable the college student pursuing the curriculum for the bachelor's degree to get considerable training in all the main divisions of agriculture, namely plant and animal production, agrotechny (especially dairying), agricultural engineering and rural economics and sociology, with the beginning of specialization in some limited subject to be pursued more fully in graduate courses or otherwise.

These are the directions in which the improvement of the college curricula in agriculture is at present tending.

One of the unsolved problems in curriculum development, which merits more attention than it has thus far received, was briefly discussed in the report of the subcommittee on college instruction in agriculture above referred to. This is the problem of connecting the various phases of scientific and agricultural knowledge which the student has considered in different parts of his college course with the actual conditions of agriculture and country life so that he may have a fair view of the agricultural problem as a whole. The suggestion was made in this report that something might be done in this direction by formulating and giving in senior year an advanced general course in agriculture, provided persons qualified by training, experience and outlook could be found for such work. Little has as yet been done in this direction.

When the matter was presented it made a strong appeal to many members of the agricultural faculties, but naturally there was much difference of opinion as to its feasibility or how it might be organized and taught. Where institutions had departments of farm management, rural economics, or sociology, it was often the opinion that such a course might best be given in these departments. There were, however, objections to this because the instructors in such departments do not always have broad enough training or experience in agricultural science and practice. In many colleges these departments are yet relatively weak. The instructors have either taken up agricultural economics or sociology as a branch of general economics or sociology, without having pursued college courses in agriculture, or being graduates of agricultural colleges have undertaken instruction in these branches without thorough training in economics or sociology.

It would therefore seem preferable that this advanced general course should be given by persons of broad experience in dealing with the problems of agricultural education as related directly to farming and country life. (613)

This matter is connected with an educational problem which is now attracting considerable attention and which a few institutions are beginning to attack. The organization and administration of curricula in American colleges has led both teachers and students to consider the various divisions of the curriculum as complete in themselves and largely unrelated to the curriculum as a whole. When the student has "passed up" on a particular subject he has tended to let it severely alone

thereafter. This has often had unfortunate results and diminished his standing as a scholar or practitioner. To remedy this it is now proposed to give "comprehensive" examinations in certain subjects at the close of the college course to test the student's acquaintance with these subjects as a whole and to determine how well he is prepared to utilize his presumptive knowledge regarding related subjects which he has studied. This is being tried in a limited way at Harvard University and a few other American colleges.

The Improvement of College Teaching

While the equipment for college teaching has been very greatly enlarged and improved in recent years, and the teachers have had more thorough technical training, there has been a wide-spread feeling that the quality of college teaching has deteriorated. The general requirement that college teachers should have advanced degrees and particularly the doctor's degree has brought into our college faculties many young men who have pursued highly specialized courses and who are without training or experience directly relating to the art of teaching. The emphasis placed on research in connection with advanced courses has led many college teachers to believe that this is their primary function and to this they have given their chief interest. Their courses of instruction and their methods of teaching have, therefore, been developed largely with reference to the interests of the instructors and without sufficient regard to the needs, capabilities and aims of the students.

The recent development of departments of education in American colleges has led to consideration of the problems of teaching and sometimes to investigation of the condition of teaching in the college generally. Having recognized the importance of consideration of the problems of teaching by establishing departments of education the colleges could hardly take the position that the study of such problems with reference to instruction in the lower schools was all sufficient.

It did not take long to discover that college teaching needed improvement and that much which had been learned about principles and methods of teaching as applied to the lower schools could be used to advantage in connection with efforts to improve college teaching. The movement in this direction was quickened and intensified by certain things which came out of the brief military control of college instruction during our participation in the World War.

In the land-grant institutions not only the influence of this general movement but also the duties relating to the training of teachers of vocational subjects in consequence to the passage of the Smith-Hughes Act aroused great interest in the problems of teacher-training. To a certain extent this was increased by the large demand on these colleges for persons well trained in agriculture or home economics to act as extension workers and in this capacity to do a kind of teaching which not only required a definite knowledge of the theory and practice of agriculture or home economics but also an understanding of the ways of approach to the mind of the adult accustomed to deal with the practical problems of farming or housekeeping.

The Committee on Instruction in Agriculture, Home Economics and Mechanic Arts, at the request of the Association of Land-Grant Colleges, undertook as its first piece of work a study on the training of vocational teachers under the Smith-Hughes Act and made a report on this subject at the meeting of the Association in November 1919. In this report it was stated that provision for teacher-training in the land-grant colleges under the Smith-Hughes Act had exerted "a beneficial reflex influence on the methods and quality of instruction in subject-matter departments. * * * Quite generally it has caused a careful scrutiny of existing courses and curricula with reference to their educational values and their adaptation to particular needs. And finally it has brought into many of the college faculties instructors or groups of instructors who are primarily concerned with bringing about improved methods of instruction." (713)

The committee then undertook in 1920 an investigation on the improvement of college teaching in vocational subjects. Questionnaires were sent to the presidents of the land-grant colleges and to the teachers of agriculture, home economics and mechanic arts or engineering. Those sent to the presidents related to the policy of the institution with reference to minimum qualifications for the initial appointment of vocational instructors, assistant professors, associate professors, and professors: means employed for following the work of teachers and encouraging improvement in methods of teaching; and the relations of resident teaching to research, extension, vocational practice and outside employment for these teachers.

The teachers were asked to give information regarding their qualifications as to academic, technical and professional training, their teaching experience and the number of subjects they are now teaching; methods of teaching, difficulties in doing good teaching, and measures of success in teaching; bases for the promotion of teachers and relations of resident teaching to research, extension and outside employment. (674)

Over 800 replies were received, of which 31 were from presidents or deans. These replies showed candidates for teaching positions in vocational subjects were usually required to have at least a bachelor's degree. However, at that time, nearly 19 per cent (including principally shop instructors in engineering departments) had no college degrees and only 14% had a second degree.

The doctorate is held by 8.8 percent of the teachers in agriculture, 1.8 percent of the teachers of home economics, 5.5 percent of the teachers of engineering and 15 percent of the teachers in departments of vocational education. (674)

Regarding professional training, 49 per cent of the teachers replying had studied one or more subjects in education and less than 9% failed to give definite values to such studies. About 60% were confining their work to one subject and less than 12% were teaching more than two subjects. The teachers of home economics were carrying more subjects than those in agriculture and engineering. The requirements regarding teaching or vocational experience before entering on college work were usually not definite or fixed.

To promote higher academic standards for vocational teachers in the colleges the committee recommended

- (1) That candidates for the position of instructor be carefully considered not only with reference to their academic and technical training but also with reference to their capacity for growth - that none be appointed who are not potential full professors.
- (2) That appointments to the position of instructor be considered purely temporary, and that candidates be given to understand that their appointment lays no obligation upon the institution to carry them on the rolls beyond the period of appointment or to promote them to a higher rank.
- (3) That the period of employment as instructor be clearly defined as a time of trial and opportunity for graduate study and that those who do not show capacity for growth and ability in graduate work be dropped.
- (4) That no one with rank below that of assistant professor be made wholly responsible for the organization and administration of a college course.
- (5) That the college pursue a liberal policy in making arrangements for instructors to do part-time graduate work and in granting leave for graduate study.
- (6) That the salaries of resident teachers be raised.(674)

To promote professional training the committee made the following recommendations:

- (1) That the colleges encourage students who hope to become college teachers to take courses in education.
- (2) That they insist upon graduate study, including courses in education, for appointment to any position higher than that of instructor. In engineering professional experience should be included.
- (3) That college instructors doing graduate work to prepare for teaching be urged to take work in education designed for college teachers, including methods of teaching, college organization, and supervised teaching.
- (4) That the colleges provide for the improvement of college teachers in service by bringing in outside lecturers and arranging for conferences or seminars among teachers to discuss methods of teaching. (674)

Interest in this report was increased in the association when it was followed by a statement by Dean Watts regarding the effort made by the Pennsylvania State College to improve the teaching of its staff by having Doctor William H. Kilpatrick of Teachers' College of Columbia University give a week's course and seminar on the principles and methods of teaching, which was attended by 95% of the faculty with quite favorable results.

In its second report on improvement of college teaching made at the meeting of the association in 1921 the committee dealt with the difficulties in attempting to do good teaching, the opportunities afforded for teachers to improve their work,

means for keeping up to date in vocational practice, extent to which teachers should engage in other pursuits, outside employment of college teachers for pay, measures to determine the success of college teachers, and the basis for their promotion.

The difficulties in doing good teaching most frequently reported were of a material nature, and such as might have been overcome to a considerable extent if teachers had had more professional training. Apparently there was

comparatively little systematic or conscious self-analysis, and still less application of the experimental method, such as conducting tests with different groups of students or varying the method and checking results. On the other hand, many have attempted to observe the results on students and their ability to apply knowledge, to compare their own methods with those of other teachers, and to get the opinions of students and alumni. (674)

Besides the opportunities for study afforded by the regular vacations ranging from one to $3\frac{1}{2}$ months ten colleges granted sabbatic leaves and 17 leave by special arrangement with part-time pay or without pay. In some institutions there were apparently no opportunities for professional advancement and in others if they existed, they were not well understood by the teachers.

A considerable number of the teachers were attempting to keep up in vocational practice by spending their vacations in shops, on farms, in home or institution work, or in consultation, commercial or extension work. Many were engaging in research or extension work and others were doing various kinds of work for pay. Owing to low salaries many colleges were permitting this practice, but in some States the laws would not allow pay from outside sources.

To determine the success of teachers more than half the institutions were employing some kind of supervision and others were seeking the opinions of associates, students and alumni. The basis of promotion was largely success as a teacher and capacity for growth. Other things were, however, more or less considered.

Ability to do advanced work and to grasp subject matter is frequently mentioned, as are also advanced degrees, study in other institutions, research, personality, character, the extent and character of his professional studies, his service to the community, his initiative and originality, and his ability to cooperate with other members of the faculty.

The committee made only the following definite suggestions -

- (1) That college presidents, deans, and heads of departments study their own facilities for helping their teachers to improve their work.
- (2) That a definite policy with reference to sabbatic leave and other leave for professional improvement, be adopted by each college, and that all of these facilities be made known to all of their teachers.
- (3) That teachers be encouraged in every way possible to study at other institutions where good opportunities for professional study are offered. It would be a good thing if colleges had funds that could be made available to pay the expenses of a few of their teachers each year to attend summer schools at other colleges. (674)

In a discussion of this subject following the report of the committee,

Prof. T. H. Eaton of Cornell University summarized the need of college teaching as follows:

- (1) Clearly defined teaching objectives appropriate to the needs of the particular students with whom we deal as prospective participants in one or another social group.
- (2) Recognition of the limitations of mental discipline.
- (3) Teaching through situations more often approximating those of the prospective life and occupation of the particular students we deal with.
- (4) Closer correlation and integration of courses now isolated.
- (5) Greater attention to individual differences in capacity to learn and in acquired experience.
- (6) Increased activity and increased satisfaction in the learning process on the part of the students.

Among suggestions for satisfying these needs were the following:

A professionally qualified teaching force: (a) Selection of ablest teachers for initial courses in departments, particularly freshman courses; (b) insistence upon professional, as well as technical qualifications, in new appointments to the teaching force; (c) requirement of professional improvement on the part of teachers in service; (d) provision of opportunities for professional improvement - in the distribution of the teaching load of the teacher, in the offering of graduate courses in sociology, economics, and education, in the organization of professionally conducted seminars in college teaching problems. (656)

The third and final report of the committee on this subject was presented in 1922. This dealt with methods for the professional improvement, while in service, of college teachers of technical subjects. It was largely based on information obtained from the presidents of the land-grant colleges.

The committee finds that all of the land-grant colleges have departments that offer courses in psychology, educational psychology, methods of teaching, and other professional studies for teachers. Replies from 43 States indicate that 40 of the land-grant colleges offer courses in psychology; 36, methods of teaching; 34, methods in agriculture; 29, methods in home economics; and 10, methods in engineering. In addition some of the colleges offer other professional courses, such as agricultural education, principles of teaching, general methods, methods in trades and industries, methods in farm shop work, measurement, and visual instruction.

From this it will appear that all of the land-grant colleges offer courses in a sufficient number and variety of studies in education to form a good background for the professional training of their teachers of agriculture, home economics, and engineering, but whether these courses are in all cases available to such teachers is not so apparent. As a matter of fact, they are sometimes not within reach; they are taught but not available to resident teachers in service. This condition is found most frequently in the smaller colleges where the facilities for graduate study are meager and the departments of education are barely able to carry the work necessary to meet the minimum requirements for training vocational teachers. (684)

In 20 of the colleges 147 teachers of technical subjects had taken courses in education while in service. The education departments were more definitely beginning to help the college teachers to improve their teaching by personal advice, by group discussions on methods of teaching in seminars, faculty meetings, and otherwise. They had not yet been called on to any extent to analyze methods of teaching in technical departments. Twenty-three of the colleges had brought in outside lecturers on educational subjects and some were making this a regular practice.

Results of this movement were becoming apparent and 15 presidents had reported definite improvement. College officers and teachers were showing a more receptive attitude toward professional training for college teachers.

The committee made the following recommendations, which were adopted by the association:

- (1) That the Association of Land-Grant Colleges declare this year in favor of professional training for college teachers.
- (2) That beginning this year the land-grant colleges make particular efforts to improve their methods of teaching by some special means best suited to their respective facilities.
- (3) That a number of colleges having strong departments of education offer immediately professional courses for graduate students preparing for college teaching, including the development of graduate work with special emphasis on its application to the technical fields of agriculture, home economics and engineering.

- (4) That until such time as courses in methods of college teaching can be made readily available to teachers of technical subjects, these teachers be permitted and encouraged to avail themselves of such courses in educational psychology and the principles of teaching as are readily accessible, even though these courses are not designed primarily to meet the needs of college teachers.
- (5) That the institutions with well established departments of education make an effort to offer strong summer courses, so that members of the teacher-training staffs in other colleges may be given opportunity to pursue special work in these colleges.

We believe and urge further:

- (6) That greater use should be made of departments of education and that these departments should become service departments in connection with the instructional work of land-grant colleges, as well as training departments for teachers.
- (7) That the land-grant colleges make definite and liberal arrangements for professional training of teachers in service and urge such teachers to take professional courses at summer schools or elsewhere for at least two successive years.
- (8) That instructors in the technical departments be urged to pursue graduate work in education with particular emphasis on research in some problem of teaching in their technical fields.
- (9) That frequent conferences should be held of teachers handling the same or related subjects. These conferences should aid in developing esprit de corps among the instructors, in improving teaching methods, in considering textbooks, in revising schedules of assignment and in scrutinizing teaching content.
- (10) That much attention should be given by the heads of departments to guiding younger teachers. Under careful supervision beginners in teaching should be given opportunity to teach a variety of subjects, thus broadening the horizon of their interests.
- (11) That experienced and successful teachers should have charge of and take part in teaching introductory and basic courses.
- (12) That beginning with 1925, candidates for teaching positions in land-grant colleges be required to have at least six semester hours of professional training, including courses in educational psychology and methods of teaching. As soon as practicable this requirement should be increased. (684)

To an increasing extent during the past decade the curriculum and instruction in agriculture have been influenced by the new theories of education. The breaking down of the theory that great importance should be attached to the disciplinary value of certain subjects, particularly mathematics and the languages, has encouraged teachers of agriculture to strengthen their courses and curricula in that subject. A curriculum of agriculture in the broad sense of that term may include much of practical scientific and cultural instruction. When the courses in the various branches of this curriculum are strongly developed and

well taught the student will have a practical and liberal education, especially if a reasonable amount of pure science, literature, history, and the social sciences are combined with agriculture in the 4-year college curriculum. Considerable progress has recently been made in standardizing the curriculum for agricultural students and bringing it into conformity with the progress of educational thought and research.

One of the newer methods of teaching, which has the favor of many progressive and well-trained educators is the so-called problem or project method. In higher education this has been most thoroughly and successfully worked out and applied in the "case" methods of teaching law and medicine, and in certain lines of engineering.

The various branches of agriculture afford much material for the problem method of teaching and some college teachers of agriculture are now using this method at least to a certain extent. To develop courses in which this method is to be largely used it will be necessary to make a definite and thorough analysis of the elements in the various farm undertakings, that is, to make a "job analysis" of agriculture in its various forms. Beginnings of such work have been made, particularly by the division of agricultural instruction of the United States Department of Agriculture in cooperation with the Federal Board for Vocational Education. These analyses have been made with special reference to the requirements in secondary education. They should be supplemented with more elaborate analysis on a scientific basis for use in college instruction.

The agricultural colleges have also been interested in the educational problems growing out of recent studies in psychology and exemplified by the intelligence tests used by the Army. For advising students regarding entrance to college and the studies to be pursued there, as well as for formulating and conducting courses, it is apparent that more attention should be paid in our colleges to the mental status of students individually rather than in the mass.

To stimulate studies and experiments in this line, with special reference to college instruction in vocational subjects, the Committee on Instruction in Agriculture, Home Economics and Mechanic Arts, undertook a study regarding "means of adapting instruction and rate of progress to the ability of students, with particular reference to the stimulation of scholarship." Its report on this subject was made to the Association of Land-Grant Colleges in November, 1923. Advantage was taken of reports of similar studies and particularly of the work of Prof. C. E. Seashore, Dean of the Graduate College of the University of Iowa and Chairman of the Committee on the Gifted Student in the National Research Council. It was found that sectioning of students according to ability had been tried in a number of land-grant colleges, most frequently in English and mathematics but sometimes in physics, chemistry, agriculture, home economics and other studies.

Sectioning was confined almost entirely to the freshman year for several obvious reasons: (1) The sectioning of freshmen is usually necessary on account of the size of the class and can be made as easily on the basis of native and acquired ability, provided satisfactory tests are available, as on any other basis; (2) most of the students in the lower levels of intelligence are eliminated in the freshman year, thus lessening the need in later years for special methods for different intelligence groups; (3) the division of second, third and fourth year students into special subject-matter groups and the elections in the upper classes decrease the need for sectioning according to ability and further stimulates effort by motivating the work.

One or more of the standard intelligence tests have been used in about half of the land-grant colleges.

In some cases the intelligence tests have been put to no immediate practical use but are being studied by departments of psychology for such bearings as they may have upon entrance credits and examinations and upon the relations between intelligence quotients and the standings determined by class records and final examinations. In no case on record with the committee have intelligence tests been used alone to determine the fitness of candidates for entrance to college, with the exception of a few veterans' bureau candidates. Nor have these tests been used alone in sectioning students on the basis of ability except in Connecticut in an experimental way. In most cases the intelligence tests (e. g., the Army Alpha tests) have been supplemented by other types of tests, such as standardized information tests, aptitude tests, placement tests, comprehension tests, and ordinary subject-matter tests of the kind that have long been used to measure the progress of students. (681)

Special or standing faculty committees on methods of instruction are increasing in number in the land-grant colleges and are aiding in stimulating scholarship among the students.

Numerous other methods of stimulating scholarship are employed. The excess credit or "point" system whereby the A and B students are given credits toward graduation in excess of semester hours' credit is in use in sixteen of the colleges. Thirty-eight of the colleges award class or commencement honors. Honor societies are found at all but three of the colleges. Student advisory systems are still on trial and occasionally amount to something more than a perfunctory signing of study cards. One type of advisory relationship is proving helpful, that is the meeting of deans or heads of departments or personnel officers with individuals or groups of students of high intellectual capacity to stimulate their working up to capacity.

Evidence is given to show that with a faculty committed to giving it a fair trial, sectioning on the basis of ability -

- (1) May be accomplished in a tentative way by means of competitive subject-matter tests given at the first three to five meetings of the class.
- (2) Does not present registration difficulties where two or more instructors can meet classes at the same hour and where the students register for a given hour rather than for a given section or instructor.
- (3) Works no hardship to any student.

Following are some of the advantages claimed for this method of grouping students:

- (1) It enables the teaching staff to keep each student at his highest level of achievement.
- (2) This makes possible the setting up of fair standards of work for all. The brilliant student can either go faster or go more thoroughly into the subject and can be given greater freedom of discussion and initiative; the low student can cover less ground on a lower standard of quality.
- (3) This in turn will make possible fair standard of measurement. At present too little is demanded of the high student, too much of the low student.
- (4) Fair standards will make for better spirit and therefore better achievement at all three levels, with particular advantages for the extremes of high and low.
- (5) Sectioning gives the poor student a fair chance, which the old system of submergence could not provide.
- (6) It is a means of discovering and encouraging the superior student through effective competition and opportunity for initiative, freedom, expansion, and self-expression.

Your committee finds that almost invariably where failure has attended efforts to teach college students in groups segregated on the basis of ability one or two fatal causes have contributed to the failure.

One of these causes of failure is lack of faith in the method on the part of the teachers concerned. Any new method undertaken in a half-hearted or prejudicial way is foredoomed to failure.

The other most frequent contribution to failure is the assumption that the high and low sections may be taught by the same methods and that the high sections will make better progress quantitatively and qualitatively without pushing on the part of the teacher. Sectioning should be a challenge to the able student and likewise to the teacher.

Progress in teaching rural economics and sociology

The efforts of the agricultural colleges to organize and improve courses in rural economics and sociology have in recent years been increasingly aided by the researches in these lines carried on by the United States Department of Agriculture through its divisions now combined in the Bureau of Agricultural Economics and by the State Experiment Stations.

The work of the American Farm Economic Association, published in its Journal of Farm Economics, and of the American Country Life Association, contained in its Proceedings, has also made a considerable contribution to the subject-matter in these fields.

The rapid growth of the literature on rural economics and sociology in recent years is indicated by comparison of the reports of the bibliographer of the Land-Grant College Association in 1913 and 1921. (635) In the former year 128 books and other separate publications issued during the previous seven years were listed. In 1921 the list included 362 titles grouped as follows: Agricultural history and development 21, agricultural land 12, cooperation 17, cost of production 26, farm labor and wages 17, farm management 36, marketing 56, rural church 11, rural credit 35, rural economics-general 29, rural population 11, rural school 8, rural sociology-general 40, rural surveys 16, and tenancy 13.

At the meeting of the Land-Grant College Association in 1923 Prof. H. B. Hibbard, of the College of Agriculture of the University of Wisconsin, in a paper on the role of economics in the training of agricultural students pointed out that three plans for organizing work in agricultural economics had been tried in the land-grant institutions. (670) It has been taught (1) in a separate department in the college of agriculture, (2) in a division of the department of economics in the college of

letters and sciences, and (3) in several departments dealing with production in an agricultural college. "The first method is the only one which thus far has given any degree of satisfaction." The course in economics for agricultural students should include not less than seven semester units, four of which should be given to the general principles of economics and three to the application of these principles to agriculture. This course should come not later than junior year and might advantageously be preceded in sophomore year by studies in economic history, agricultural geography and book-keeping. Specialization in agricultural economics for those students majoring in this subject should be arranged for in junior and senior years.

This subject was also discussed by Dr. Henry C. Taylor, Chief of the Bureau of Agricultural Economics. He advocated the teaching of economic geography, agricultural history, elementary statistics and graphic methods, farm inventories and accounts in freshman and sophomore years and the outlines of agricultural economics in junior year. These required courses should be followed by the choice of three special courses from the following list: Agricultural statistics, farm management and practice, marketing of farm products, cooperative marketing at home and abroad, agricultural finance, land problems, country life problems. "It should be borne in mind that what the student gets out of the study of economics is not a formula that will serve as a guide to his actions in the future, but rather a method of gathering facts and analyzing problems, which method may be applied to the solution of such problems as will arise from time to time as he enters on the duties of everyday life."

At the Massachusetts Agricultural College in 1923-24 in its division of rural social science, besides one required course in agricultural industry and resources and 14 elective courses in various branches of rural economics, there were offered by three instructors one required course in the elements of rural sociology and elective courses on the social condition of rural people, rural government, rural organization, field work in rural sociology, and rural social surveys.

At the New York College of Agriculture at Cornell University in 1924-25 courses were listed in about 20 different subjects under the heads of farm management, marketing, rural economy and history of agriculture in the department of agricultural economics and farm management, and in the department of rural social organization courses were offered on the social problems of rural communities, the rural family, organization of agriculture in the United States, rural leadership, the rural community, the social psychology of rural life, the village, field work in rural society and research in rural social organization.

In an article on the development of the work in agricultural economics and allied subjects published in Bureau of Education Bulletin 37, 1924, Dr. Taylor sums up progress in recent years as follows:

In the academic year 1909-10, 82 courses, averaging 3.3 credits, were offered in 40 of our agricultural colleges, while in the academic year 1919-20, 308 courses, averaging 3.4 credits, were offered, or an increase of 275 per cent in the number of courses offered. Instruction in farm management increased rapidly, as indicated by the fact that the number of courses offered increased from 42, averaging 3.6 credits, in 1910 to 85 courses, averaging 3.9 credits, in 1920. This shows an increase of 102 per cent in the courses offered in this subject. The courses offered in agricultural economics increased from 22, averaging 3.1 credits, to 56, averaging 2.9 credits, or an increase of 155 per cent for the period 1910 to 1920. Courses

in marketing were not introduced until 1911, in which year two courses were offered. The growth in this subject has been rapid, and to-day land-grant colleges are offering 42 courses. All other courses besides farm management, agricultural economics, and marketing have increased from 18 to 125 per cent. (602)

In 1910 22 colleges employed 28 part-time instructors and 6 colleges had 11 full time instructors in agricultural economics; in 1915 31 colleges reported 49 part-time instructors and 14 had 46 full time instructors; in 1921 30 colleges reported 79 instructors and 26 colleges had 104 full time instructors. In 1921, 70 of these instructors in 29 colleges had B. S. degrees; 60 instructors in 27 colleges had M. S. degrees; and 41 instructors in 21 colleges had the Ph. D. degrees. At that time 33 land-grant colleges reported 6,908 regular, 3,109 special, 294 short-course and 268 post-graduate students, making a total of 12,770 students engaged in work in agricultural economics, farm management and allied subjects.

In the same publication C. J. Galpin states that from 1911 to 1922 rural sociology was admitted into 40 land-grant colleges and full time professors of this subject were employed in 15 colleges.

Courses in rural sociology have thus far been mainly of undergraduate grade and have usually been for juniors and seniors. A few colleges are offering graduate courses. A considerable number of master's degrees and a few doctorates have been granted to students majoring in rural sociology.

Recent Research Work of Agricultural Colleges

The agricultural colleges have continued to do research mainly through the experiment stations. Owing to conditions growing out of the World War the growth of the stations during the past decade has been relatively slow.

In 1925 these stations had an annual income of about \$10,500,000 including \$1,440,000 from the Federal Government under the Hatch and Adams Acts. They employed about 2,400 trained workers, about half of whom did more or less teaching in the colleges. They issue annually about 1,000 publications freely distributed to nearly a million addresses. The contents of these publications are generally summarized in the agricultural press and form the basis of much of the extension work of the colleges. Many of them find their way abroad. Summaries of all of them are regularly published in the Experiment Station Record, and sent to libraries and agricultural institutions throughout the world.

In 1924-25 the total number of projects carried on by the experiment stations was 5,538. These dealt with a great variety of problems relating to soils, field crops, horticulture, animal husbandry, plant and animal diseases, beneficial and injurious insects, noxious animals, dairying, rural engineering, farm buildings, water supply, sanitation, foods and human nutrition, etc. There were also 285 projects in the field of rural economics and sociology.

The Purnell Act of February 24, 1925 authorizes an increase of Federal funds to the experiment stations to the extent of \$20,000 to each State for the fiscal year 1926 and an additional sum of \$10,000 each year for four years, after which the annual sum will be \$60,000 as long as this law is in force. Appropriations under this act must be made annually by Congress.

The funds appropriated pursuant to this Act shall be applied only to paying the necessary expenses of conducting investigations or making experiments bearing directly on the production, manufactures, preparation, use, distribution, and marketing of agricultural products, and including such scientific researches as have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry, and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life, and for printing and disseminating the results of said researches.

It is expected that this Act will greatly broaden and strengthen the research work of the agricultural experiment stations in the field of rural economics and sociology and home economics and that this will react very favorably on the resident teaching and extension work of these institutions in such lines. The history of the Purnell Act is given in the Proceedings of the Land-Grant College Association for 1925.

Short Courses

The wide spread of the extension work and the great increase of secondary schools in which agriculture was taught, brought into prominence problems relating to the short course work of the agricultural colleges, which had become very varied and complex. In 1924 the Committee on College Organization and Policy of the Land-Grant College Association, with the approval of its Executive Body, asked the Committee on Instruction in Agriculture, Home Economics and Mechanic Arts "to study the aims, character, duration and present status, proposed development and changes (698) of the short courses offered at the land-grant institutions." ^ It was found that 45 of these institutions were offering short courses in agriculture, as compared with 22 in home economics and 24 in mechanic arts. These courses varied in length from one day to three years. They covered a wide range from such broad subjects as

general agriculture, farm management, agronomy, horticulture, forestry, animal husbandry, dairying, veterinary medicine and economic entomology; those of median scope, such as soils, market gardening, cotton, deciduous fruits, citrus and sub-tropical fruits, floriculture, beef cattle, poultry, bee keeping, farm structures; to specialties, such as grain grading or judging, nut culture, ice cream making, cotton marketing and classing, elevator management, and land classification and appraisals. There were also courses for canners, herdsmen, gardeners, nurserymen, editors and teachers.

In general, the short-course work in agriculture has had a longer history and been more elaborately and frequently developed than the similar work in home economics or mechanic arts. These agricultural courses are either somewhat general or deal with some agricultural specialty. Sometimes they are given to adults and sometimes to children of high school age or younger. In some cases definite entrance requirements are made, particularly to those courses of longer duration, but much more generally there are no such requirements. In some institutions the courses of high-school grade of two or three years' duration are organized as schools of agriculture. In some cases where courses of from one to three years are offered, at least a part of the work is carried on in connection with the regular four years' course. In the shorter courses, the work often consists of lectures, with perhaps some field or laboratory observations by the students; in other cases the students take an active part in field or laboratory operations. The courses varying from 2 to 10 days are often essentially conferences, but not usually so designated, at which there may be discussions and observations on a variety of subjects, but very little, if any, systematic instruction. They are chiefly inspirational and informative and often seem to be intended primarily to acquaint the persons in attendance with the equipment and general character of the work of the institution and to inform them what aid the institutions can give them at their homes or if they attend the regular courses at the college. (698)

A considerable amount of the short course work listed under mechanic arts was in the field of agricultural engineering and the special units such as tractor repair and operation, gas engines, blacksmithing, etc.

The aims of the short courses are variously defined in the college catalogues and in the replies to the committee's questionnaire, but essentially they seem to be comprised in one or more of the following statements: (1) To prepare persons not in school to engage in agricultural pursuits, home making, or industrial occupations; (2) to increase the knowledge and improve the practices of people now engaged in agriculture, home making, or mechanic arts; and (3) to inform those who attend short courses at the land-grant colleges as to the personnel, equipment, and other facilities of the institutions for aiding them when they return to their homes and engage in their various occupations.

There are those in the land-grant institutions who feel that considerable inconvenience is put upon regular college teachers who have to assume duties connected with short courses in addition to their regular courses. Not only the individuals but the departments have felt these hardships where an extra teaching force has not been provided.

A considerable number of the land-grant institutions are employing special directors of short-course work. This is a good plan, since this office has more time and can use special efforts to make short-course life at the institution more interesting and also more profitable.

The character and variety of the short-course work are evidently being affected by present day educational movements of various kinds. There is, for example, a wide spread feeling that the large investments of funds in the buildings, equipment, and faculties of the colleges is not justified unless the plant and personnel of these institutions are being used to the fullest extent. Then there is the prevalent notion that mature persons engaged in particular pursuits are greatly benefited by even a short stay at the institutions where they may receive intensive instruction or information from experts. Thus we have what are called unit courses of various kinds for doctors, teachers, butter-makers, poultrymen, fruit growers, automobile chauffeurs, metermen, plumbers, and home makers.

The recent studies in educational psychology, which seem to call for new classifications of students according to their actual mental ability, are raising new questions regarding variety, character, and length of courses which the colleges should offer. (698)

The committee felt that the colleges should make a definite effort to organize their short course work so that it would not interfere with the proper performance of the research, long-course teaching and extension work. They believed that the demand for short courses would continue to increase and that the present-day outlook in education favored the use of such courses.

To clarify what is now evidently a confused condition the committee suggests that the colleges formulate and adopt a standard definition of short courses and as far as possible, uniform designations regarding their duration and character. As an aid in this direction the committee makes the following propositions:

(1) A short course is a course of systematic instruction in a given subject or group of subjects of shorter duration than a four-year college course and not leading to a degree. Obviously a course of systematic instruction can not be given in a few unrelated lectures within a period of a few days.

(2) Extension meetings, farmers' weeks, and similar meetings for a few days, having a miscellaneous program and no really systematic instruction, should not be called short courses but conferences or institutes.

- (3) Short courses may be classified according to their duration as years' courses, months' courses, or weeks' courses and should be designated by their duration rather than by the general term, "short course". For example, instead of announcing a short course in dairying, occupying six weeks, the college should announce a six-weeks' course in dairying.
- (4) Full consideration should be given by the colleges to whatever informational or instructional work is being done by their extension departments, by the special secondary schools or by the ordinary high schools, and they should so limit and organize short courses as to give them a definite place in the college program without duplicating the work of other agencies.
- (5) The colleges should plan to give up short courses of regular secondary grade, whether organized as schools or not, as soon as there are other agencies prepared to do this work.
- (6) It is doubtful whether the colleges should continue to offer one to three-years courses in general agriculture, home economics, or mechanic arts. As far as the committee has been able to ascertain these are usually not successful as separate enterprises in the college program, and the demand for such courses appears to be decreasing. It would be better to let properly qualified students enter the regular college classes as special students and leave them at certain periods whenever definite units of instruction have been completed. In such cases there can be little objection to the college giving a statement to the student of what he has accomplished during his residence at the institution.
- (7) Short courses should as a rule be confined to special subjects and should be organized for persons not less than 18 years of age, as far as practicable in units, each of which may be taken separately by the student according to his option.
- (8) Since short courses should be planned more particularly for persons engaged or who are expecting to engage in farming, home making, some vocation in mechanic art, or other definite pursuit, and the number of such courses to be offered by individual institutions must necessarily be limited, each college should carefully determine the conditions of agriculture and industries in its State in relation to the need for such courses and the ability of the college to supply that need and make its schedule of short courses on that basis. Sometimes a college has encouraged certain industries by its short courses when a more careful study would have shown that such industries had little chance of success in the region of the college.
- (9) The special units or enterprises in agriculture, home economics, and mechanic arts should be clearly defined after studies and analyses have been made of each to determine what the jobs in each enterprise are and the fundamental knowledge and skill one who desires to follow a vocation in any of these fields should have.
- (10) The analyses should consist of making a detailed study of the job-unit operations of enterprises such as poultry and swine for agriculture; millinery, meal planning and preparation for home economics; and gas metering, plumbing, or tractor operation for mechanic arts.

771

(11) In making the analyses close contact with those engaged in the practical application of these jobs might be maintained to advantage. For example, it is advisable to confer with the successful poultryman regarding the fundamental jobs in conducting a poultry enterprise. Likewise, the successful home maker, plumber, or carpenter might be interviewed for information regarding his particular enterprise.

(12) Colleges in regions having diversified industries conducted under similar conditions would do well to confer with one another with reference to arranging a common program for short courses in accordance with which each college will do what it can do best and encourage students to go where they will find what best meets their particular needs.

(13) Short courses that can be most effectively conducted away from the college either by the college or by other properly coordinating educational agencies should be encouraged. They are less expensive for students, who can reside at home, and often enable the use of better facilities of a practical character than are available at the college.

(14) Short courses should be distinctly vocational in their nature with the major emphasis placed upon the practical and the minor emphasis upon the theoretical. (698)

General Status of the Agricultural Colleges

Between 1915 and 1925 the work of the agricultural colleges in the United States was greatly broadened and strengthened. The organization of these institutions became more sharply defined so as to make the major lines of work distinct as (1) research (mainly through experiment stations), (2) resident graduate and undergraduate teaching, and (3) extension work. In all these lines the work went beyond that which relates to agricultural production and included a considerable range of subjects in rural economics and sociology.

The general character of these institutions as public agencies for the promotion of agriculture and country life also underwent considerable modification. This was shown not only by the recent Federal and State legislation affecting them financially or otherwise, but also by the closer and wider relations which they had with the Federal government, State organizations, local communities and great numbers of individuals in all parts of the several States.

The assumption of the duty of training teachers for the secondary schools affected the agricultural colleges favorably in several ways. It greatly broadened the interest of the college authorities and teachers in the problems of agricultural education and the application of pedagogical principles to the teaching of agriculture. It opened a new vocational outlet for a considerable number of graduates from the agricultural courses of these colleges. It gave these colleges more prominence in the thought of the pupils in many high schools and brought a considerable number of them to the colleges for long or short courses. It fundamentally affected the relation of these colleges to the public school system of the several States and made them more fully an essential part of this system. Since the United States has only begun to develop a comprehensive system of vocational education, we may expect that with the accelerated progress which such education will make, the colleges standing at the head of the agricultural division of this system will have an increasingly important part to play in its development and maintenance.

Resident teaching in the agricultural colleges was greatly strengthened and diversified. The courses in the various branches of agriculture in general became more highly specialized and technical. Emphasis was strongly placed on courses in rural engineering, rural economics and sociology. Special attention was paid to better organization of the curriculum, the adoption of a group system of electives, provisions to meet the needs of individual students according to their interests and capabilities, promotion of better teaching, and recognition of the importance of expert supervision of the educational work as a whole by the appointment of directors of resident teaching or similar officers.

Graduate courses for investigators, teachers and experts in agricultural specialties increased, particularly in the stronger colleges or universities where agriculture and related subjects were taught.

A considerable number of the graduates of the agricultural colleges engage in general farming. Scattered throughout the States such men are often leaders of agricultural progress in their several communities. Others pursue agricultural specialties, such as breeding of improved seeds or types of livestock, orcharding, forestry, greenhouse culture of vegetables, flowers, etc. Many become administrative officers or teachers in colleges and schools, or investigators in experiment stations or the United States Department of Agriculture. Others hold administrative offices in Federal and State departments of agriculture or other public services.

There are now many lines of business in which such graduates are employed. Social workers and even missionaries are being trained in our agricultural colleges. More than a hundred occupations are open to graduates of these colleges.

The agricultural colleges, through their research, teaching and extension work have attained a broad leadership in agricultural progress and their influence is increasingly felt in all parts of the United States. They have in large measure

made successful farming an occupation requiring not only skill, thrift and good business ability, but also a knowledge of scientific principles and their direct and proved application to farm operations. The value of such knowledge has been more broadly demonstrated than ever before during the recent economic depression of agriculture, due to worldwide causes over which individuals had no control. In this difficult situation there have been many farmers whose knowledge of improved practices, gained directly or indirectly from our agricultural colleges, has enabled them to weather the storm and keep their business going with a measure of success unattainable by their more ignorant neighbors. This is why the farming people have held on to the extension forces of the agricultural colleges and have led the legislatures in many States to increase the personnel and equipment of these institutions for resident teaching and experimental work. Particularly have the farmers asked the colleges to strengthen their teaching and research on subjects within the field of rural economics. Appreciating the great benefits that have come to agriculture from the work of these institutions relating to agricultural production, the farming people are hopeful that when they are strongly engaged in economics work they will be able to do much toward giving agriculture a sounder and more stable economic basis.

Part VII.

Secondary Education in Agriculture, 1862-1925.

PART VII

Secondary Education in Agriculture 1862-1925

Disappearance of Agriculture from Secondary Schools 1862-1880

When the college land-grant act of 1862 was passed agriculture had almost entirely disappeared from secondary schools. After the Civil War the public high schools increased rapidly in number and attendance but their courses of study were literary and scientific and were very largely determined by the requirements for entrance to colleges, though very many of their students did not take or complete such preparatory courses. Such academies as survived competition with the high schools made their courses conform closely with those of the public schools.

In 1876 considerable interest in manual training was aroused by the exhibit of the Russian system at the Centennial Exposition in Philadelphia. Under private auspices the establishment of manual training schools was begun soon thereafter in New York City and St. Louis, and somewhat later in Chicago, Toledo, Cleveland and Cincinnati. A public manual training school was organized in Baltimore in 1884 and very soon thereafter in Philadelphia and Omaha. This movement grew rapidly after 1890, and some work in manual training was undertaken in many high schools. In 1894 the Bureau of Education received reports from 15 manual-training schools with 3,362 students. In 1913, 1,677 schools were giving such instruction to 183,571 students of secondary grade.

When the land-grant colleges were established it was quite generally supposed that they would meet the need for agricultural education. In many States they admitted students from the common schools and maintained preparatory departments. Some elementary and informational instruction in agriculture was early given in these colleges, in some cases even to preparatory students, and farm labor was required or encouraged. We have seen, however, that as these colleges developed

the tendency more and more was to confine the direct teaching of agriculture to junior and senior years and to lay the foundations for this instruction through the teaching of fundamental sciences in freshman and sophomore years, with more or less attention to their agricultural relations. The result was that very many students who had enrolled in agricultural courses in these colleges prior to 1900 left college without having received any instruction in agriculture as a distinct branch of knowledge.

It was soon apparent that only a small number of students out of the masses of farm children would go to these colleges at all and that very few of those who did go would receive any considerable amount of agricultural instruction. The colleges might do much for agriculture by training experts and leaders and through their research and extension work but they would have to be supplemented by lower schools in which agriculture was taught if ever the real need for agricultural education was to be supplied in any large measure.

We have seen that economic and educational conditions in the United States during the second half of the nineteenth century were unfavorable to the development of agricultural instruction even in the land-grant colleges. It is therefore not surprising that comparatively little was done to organize such instruction in secondary schools between 1862 and 1880. During that period individuals and agricultural societies here and there urged the importance of teaching agriculture in the public schools.

Beginnings of a New Movement for Agriculture in Secondary Schools
1881-1900
Storrs Agricultural School in Connecticut

The Storrs Agricultural School was established in the town of Mansfield, Connecticut in 1881. This came about from the offer made by Augustus Storrs, a native of that town, to donate a farm of 170 acres, with several buildings, for such a school. His brother, Charles, also offered \$6,000 for equipment

and improvements. The State legislature accepted these offers and passed an act establishing the school and granting it \$5,000 annually for maintenance. An active participant in this movement was Theodore S. Gold, Secretary of the State Board of Agriculture and the former principal of the Agricultural School at Cream Hill, Connecticut, (see p.178), which he had felt obliged to close in 1868.

The organic act stated that the Storrs School was to be "for the education of boys, whose parents are citizens of the State, in such branches of scientific knowledge as shall tend to increase their proficiency in the business of agriculture." (157) The school was to be managed by a board of trustees, six of whom were to be chosen for a term of four years by the State Senate and one by the State Board of Agriculture. The director of the Connecticut Agricultural Experiment Station was made a trustee ex-officio and the Governor was president of the board. Mr. Gold became a trustee and served for twenty years. As secretary of the board he had much to do with its organization and management. Prof. S. W. Johnson was the representative of the experiment station on this board. The school was at first housed in a building on the farm, which had been constructed for a boys' boarding school and afterwards had been used for a number of years by the Soldiers' Orphans' Home.

To enter the school students must be at least 15 years old and pass examinations in English, arithmetic, geography and American history. A two-years course of three terms of 12 weeks each was organized, with the long vacation in the summer. The subjects taught were general and agricultural chemistry, natural philosophy, botany, zoology, geology, animal physiology, mineralogy, farm mechanics, surveying, theoretical agriculture, stockbreeding and English composition. The first year was given to the natural sciences and agricultural science was taught in the second year. The students were expected to "acquire dexterity"

on the farm and were required to labor 3 hours a day in the fall and 5 hours in the spring.

Agriculture was taught by lectures and in agricultural chemistry the textbooks were Johnson's "How Crops Grow and Feed," and Armsby's "Manual of Cattle Feeding." About 1885 students began to make analyses of fertilizers, fodders, milk, etc. Elementary geometry and farm accounts were added to the course. At first instruction was given by the principal and one professor but in 1885 a professor of agriculture and horticulture was added to the faculty. He had been farm superintendent at the State Reform School for 27 years. At the Storrs School he was also farm superintendent and spent much of his time in efforts to build up the farm, which was much run down. The first herd consisted of 7 grade cows but soon a few purebred dairy cattle were added and in 1887 the livestock included 27 cows, 3 horses and 7 pigs.

There was no village nearby and for several years only about 30 students could be boarded at the school. The first graduating class had 6 members. No degrees were granted.

In 1888 an appropriation of \$10,000 was made for a laboratory and a barn and in 1890 \$50,000 was granted for a main building and a dormitory. That year one half of the Federal appropriation under the Hatch Act was given by the State to this school for an experiment station. Field experiments were begun on the school farm but the laboratory work was carried on at Wesleyan University, Middletown, Conn., where the director, Prof. W. O. Atwater, had his headquarters. A small office building was constructed on the farm at Storrs. The vice-director of the station was located there. He was also at first associate professor of agriculture and in 1891 became professor, the separate office of farm superintendent having been created.

The school course was lengthened to three years and the time devoted to instruction in agriculture was extended from 40 to 144 hours. The senior class was employed in connection with the station work. In 1891 there were 63 students and 13 graduates.

In 1893 the legislature changed the name of the institution to the Storrs Agricultural College and transferred to it from Yale University the land-grant fund and the income from the Morrill Act of 1890. Women were also admitted. Professors of veterinary science, horticulture and domestic science and an instructor in wood and iron were added to the faculty. The course was lengthened to four years and the degree of Bachelor of Agriculture was granted to students completing this course. That year 109 students were enrolled. The name of the college was again changed in 1899 to Connecticut Agricultural College and in 1901 the requirements for entrances to the four-years' course were somewhat raised and the degree of Bachelor of Science was created, which was first given in 1904. Two years' courses were also offered to graduates of the common schools.

Entrance requirements were gradually raised until in 1914 they involved four years of preparation in a secondary school. Two years' courses were, however, retained and in 1923-24 there were 71 students in such courses.

Rhode Island Agricultural School

Rhode Island followed the example of Connecticut by establishing a State school of agriculture at Kingston, in 1888, which was changed to the Rhode Island State College in 1892, when the benefits of the land-grant act of 1862 and the Morrill Act of 1890 were transferred to it from Brown University.

Agricultural School at University of Minnesota

The organization of a secondary school of agriculture in connection with the College of Agriculture of the University of Minnesota in 1888 was another step in the development of agricultural education which had very important results. (p.574) It afforded a good example of what might be done for agriculture in a well-equipped secondary school. It thereby encouraged the organization of other schools not only in the agricultural colleges but as separate institutions in different parts of Minnesota and in other States.

The Minnesota School of Agriculture came as the final result of various efforts which the University of Minnesota had made to satisfy the demand of the farmers of the State for practical instruction in agriculture. On April 20, 1874, President W. W. Folwell presented to the board of regents a plan for what he called a professional school of agriculture. His suggestions for the organization and work of this school were as follows:

1. That the board of regents offer a course of free professional instruction in agriculture and horticulture, beginning in November and ending in March, covering about 100 working days.
2. That there be formed a class, to be composed mainly of young men, either actually engaged in some branch of agriculture, or intending soon to begin.
3. That the instruction be given partly by members of our permanent corps, and partly by lecturers brought from other quarters.
4. That such gentlemen as the following be employed as the lecturers: Professor Warder, on horticulture; Professor Riley, on entomology; John Stanton Gould, on agricultural machinery; Professor Law, on veterinary science; Professor Miles, on general agriculture. These names are suggested merely as representatives. From ten to twenty lectures might be had from each expert.
5. That the lectures be open to all comers; that no conditions be put upon admission, except a registration and a general pledge to punctual attendance; and that an examination be offered to all who may please to undergo it.
6. That if resolved upon, this plan be promptly and industriously advertised, and that arrangements be made for the maintenance of students from abroad at low rates. (284)

In 1875-76 a free lecture course of ten weeks for men engaged in farming was offered on condition that 30 persons enrolled for it and this offer was repeated for five years but the course was never given.

Professor Edward D. Porter became head of the agricultural department of the university in 1880 and in the winter of 1881-82 a lecture course of four weeks for farm men and women was given with an attendance of 191. Professor William H. Brewer of the Yale Scientific School was one of the lecturers and spoke on stock-breeding. The following winter the attendance was 281 and in 1883-84 "reached the high-water mark of 1,118." At this time Juliet Corson, as lecturer on domestic science, "drew the great crowd."

The first week of this farmers' course was devoted to horticulture, the second to animal husbandry, the third to dairy and sheep husbandry and dairying, and the fourth to farm hygiene, forestry, cereals, soils and farm management.

After President Cyrus Northrop came in 1884 the lecture course was dropped but a practical school of agriculture was held from May to November, 1885, for 5 students working on the experiment farm. In 1887 the attendance was 10. The president meanwhile had brought in Mr. O. C. Gregg as superintendent of farmers' institutes, which had already been conducted in the State with considerable success. The legislature in 1887 appropriated \$7,500 for this work but put it under a separate board.

Dissatisfaction at the failure of the university to do more for agricultural and industrial education reached a crisis in 1887 when the legislature appointed a committee of investigation and there was considerable sentiment in favor of a separate agricultural college. The board of regents then appointed an advisory board of seven farmers and Professor Porter was instructed to consult with them regarding the establishment of a school of agriculture on the experiment farm. This was endorsed by the advisory board "as promising the best possible solution of the problem of agricultural education in Minnesota."

The plan adopted for the school was substantially that framed by David L. Kiehle, a member of the board of regents and State Superintendent of Public Instruction. He had long been a strong advocate of manual training in the public schools. This plan as first published in "The Farm, Stock and Home" in February, 1888, was as follows:

In the organization of a school of agriculture, as it seems to me, the following considerations should govern:

1. It should meet the demands of the young farmers who desire a knowledge of such matters of business, science, and agricultural experience as belong to the calling.

2. The school should receive them at the close of a good common school training, and at an age not younger than fifteen years.

3. As it is intended for those whose life and labor are on the farm, the term should include the months during which they are at leisure, say five months, from November 1 to April 1.

4. The course of the school should be mostly objective, manual, practical, and scientific, and in its results should accomplish the following: (a) It should cultivate and strengthen the taste and abilities of agricultural life. The student should therefore pursue his school life as closely as possible with his life on the farm. To be absent too long and to become accustomed to other surroundings will wean from the farm. Hence, a course to be completed by winter terms has two advantages. It leaves the student the working season to apply his learning and earn wages for his support. It also continues his life on the farm without a long break, and so strengthens rather than weakens his taste for his chosen calling. (b) It should cultivate his powers of observation and judgment, and his manual skill in lines belonging to his occupation. (c) It should make him acquainted with the elements of those branches of science most immediately allied to his calling.

I. General Business Course

(1) Reading and composition; (2) business arithmetic; (3) bookkeeping; (4) geography - (a) descriptive, (b) physical; (5) United States history; (6) civil government; (7) political economy; (8) drawing.

The instruction in these branches should be given, in matter and in method, especially practical and adapted to the needs of this class of students.

II. Scientific and Manual Training Course

(1) Shopwork; (2) chemistry; (3) mineralogy and composition of soils; (4) botany; (5) physiology; (6) natural philosophy.

These subjects should be taught objectively and thoroughly in the elements. In this course the student should learn the use and care of common tools; he should become familiar with laboratory work, with the most common elements that enter into foods and soils, together with the laws of their chemical combinations; he should know of botany by a study of plants, and he should learn of animal physiology by the study of animals themselves, dissected and examined with his own hands and eyes.

III. Lecture Course.

(1) Farm management - (a) system, (b) economy, (c) business; (2) soils; (3) plants; (4) stock - (a) breeding; (b) feeding; (5) farm hygiene; (6) farm architecture; (7) farm home.

This course should bring to the students, in familiar talks, the practical experience of men who have worked and observed intelligently in these different lines.

783

This wintercourse is distinct and independent, in the interest of those who desire to return to their farms for labor during the summer months.

A similar summer course may be provided for such as desire practical experience as might be given on the experimental farm.

As students appear with ability and ambition to pursue their studies still further the department of agriculture in the university is prepared to receive them and to advance them to the honorable degree of bachelor of agriculture. (284)

In the circular of information of the Bureau of Education on the "History of Education in Minnesota", Regent S. M. Owen says that

No proposition suggested in the foregoing met with more adverse criticism than the one to hold the school during the winter months, when, it was said, practical agriculture could not be taught, since the opportunity for object lessons in crop growing and conditions of practice would be wanting. But experience has confirmed the predictions of Professor Kiehle. Many of the disadvantages of teaching practical subjects in the winter have been overcome by means of plants, animals, machines, charts, models, and other illustrative material which from year to year is being collected. The boy receives instruction during the winter that he is eager to put in practice on the farm during the succeeding summer. While at work there, he discovers defects in his education that cause him to look forward with pleasant anticipation to the second term of the school, when the defects may be remedied. (285)

The organization and work of this school were greatly aided by the prior establishment of the agricultural experiment station on a farm at St. Anthony Park, between Minneapolis and St. Paul. This station, begun in 1885, became firmly established in 1888 under the Hatch Act. It had 249 acres of land, a chemical laboratory, farm house, barn, implements, livestock, water system, etc. Its staff contained a number of men trained in agriculture and related sciences who could give part of their time to teaching in the school. A building for "educational, culinary and dormitory service," costing about \$40,000, was immediately erected. The school was opened October 18, 1888 with 18 students, increased during the term to 47.

The faculty of 9 teachers included W. W. Pendergast, Principal and teacher of physics and physical geography; H. W. Brewster, mathematics; C. R. Aldrich, manual training; D. W. Sprague, penmanship; and from the experiment station, W. M. Hays, agriculture; Olaf Schwartzkopff, physiology and veterinary science; Samuel B. Green, horticulture and applied botany; Otto Lugger, entomology, and D. N. Harper, agricultural chemistry.

The course of study covered two years, each of 2 terms of 12 weeks. In the first year there was instruction in English, arithmetic, algebra, accounts, physical geography, botany, physics, woodworking, mechanical drawing, and lectures on farm management, farm architecture and horticulture; in the second year, algebra, geometry, civil government, political economy, agricultural chemistry, animal physiology and lectures on grains, soils, fertilizers, livestock, dairying, horticulture and veterinary science. To receive a certificate of graduation a student must not only complete this course but must also work in some branch of agriculture during two summers. A limited number of students had opportunity to do this practical work on the farm where the school was located. In 1889 the course was considerably changed and again in 1890-91 when a preparatory year was added.

In 1892 the course was reorganized to cover three years and in 1902 an intermediate year of academic studies was added for students desiring admission to the college of agriculture. In 1891 a dairy building was erected. A course in dairying of about 4 weeks was offered and a special dairy school with a term of six weeks, especially for persons engaged in the manufacture of butter and cheese. In 1894 a summer school of 4 weeks was opened for women and this led to the building of a dormitory for women in 1897 when they were admitted to the School of Agriculture on equal terms with the men.

The agricultural instruction in this school at first was meager but was gradually expanded and strengthened as teachable material was accumulated and formulated and more adequate laboratory and field exercises were developed. Members of the faculty also prepared textbooks and bulletins which greatly aided the work of the school. Among these were Professor Green's books on fruit growing, vegetable gardening and forestry, Professor Harry Snyder's "Chemistry of plant and animal life," and "Dairy Chemistry", Professor Goff's and Principal Mayne's "First Principles of Agriculture", and the "Exercises in Agriculture and Housekeeping for Rural Schools," edited by Professor Hays.

This school and the experiment station were so successful that the legislature from time to time appropriated generously for buildings, equipment and current expenses. For a considerable period the schools of agriculture and dairying overshadowed the collegiate work in agriculture but after a time students began in goodly numbers to take the college courses in Minnesota, as in the other States. Thus a great college of agriculture was gradually built up as the outcome of the definite organization of a secondary school of agriculture within the university.

The following summary will show the relative attendance in the schools and the college at intervals during 20 years beginning with 1888.

	<u>School of Agriculture</u>		<u>Dairy School</u>	<u>College</u>
	<u>Men</u>	<u>Women</u>		
1888-89	47	-----	-----	-----
1890-91	104	-----	28	5
1894-95	204	59	90	9
1899-1900	327	80	73	23
1904-5	387	143	87	34
1908-9	462	192	107	188

Alabama Agricultural Schools

Alabama began the organization of secondary agricultural schools in the several Congressional districts under a State act of February 28, 1889, "to establish a branch agricultural experiment station and branch agricultural school in North Alabama." (123) Under this act two institutions were established, which were to be branches of the Agricultural and Mechanical College at Auburn.

The act provided that the commissioner of agriculture and the director of the State agricultural experiment station should locate them and accordingly they were put at Athens and Abbeville. Each school was to have its own board of control consisting of the two State officers above mentioned and five progressive farmers appointed by the Governor. The State appropriated \$3,000 for each school the first year and thereafter \$2,500 annually, which was increased to \$3,000 in 1893, when schools at Albertville and Evergreen were provided for. An act of February 13, 1895 established 5 more schools to be located by the

governor, superintendent of education and commissioner of agriculture. These were placed at Jackson, Sylacauga, Netumpka, Hamilton and Blountsville. In a separate act provision was made for the support of the nine schools by giving them 1/2 the proceeds of the "tag tax" on fertilizers sold or exchanged in the State. Objection to State support of such schools then arose and it was argued that such a tax was "class legislation calculated to work hardship upon the tillers of the soil." To avoid this difficulty the legislature in 1907 resumed appropriations for these schools from the general funds of the State. The nine schools were brought under a general act of January 30, 1897, which gave each school \$2,500 annually and put the superintendent of public instruction on the board of control in place of the director of the State experiment station. (Later the boards were made to include the governor, superintendent of public instruction, commissioner of agriculture and two local members for each district.)

All the schools are required to teach practical and scientific agriculture, which must be taken by all students over 10 years of age who receive free tuition. A normal course must also be maintained. Agricultural experiments must be made and the results published in bulletins. The schools are coeducational.

These schools proved to be a useful addition to the public school system of Alabama. As might have been expected there were in the early years considerable difficulties in conducting agricultural instruction in such schools for there were practically no teachers trained for such work. However, through the employment of teachers who were either graduates of the Alabama Agricultural College or had received agricultural instruction elsewhere, the use of such elementary agricultural textbooks as were available, observation of the experiments, demonstrations and other work on the school farms, and the labor of students in the fields and school gardens, many children were brought into contact with improved agricultural practices and received knowledge of the scientific principles underlying good

agricultural practices. There was undoubtedly too much of a tendency to make these schools serve the general purposes of public schools for their districts and especially for the communities in which they were located but even so they were doing useful work at a time when high schools were scarce in the State. The State was spending only a small sum for their support as agricultural schools and the local communities were furnishing their land, buildings and much of their current expense. In his message to the legislature in 1907 Governor Comer summed up the work of these schools as follows: "The nine agricultural schools located one in each of the nine Congressional districts are doing a great work and should be encouraged. * * * These schools are located in different parts of the State, generally where board is cheap, and they furnish boys and girls outside of the cities not only with the most economical agricultural lessons, but also with the best substitute for high schools." He favored an increased appropriation, and the legislature responded by granting \$4,500 a year to each school, with the proviso that \$750 should be spent for experiments. The experiments were to be made under the "direction of the board of control and the professor of agriculture of the Alabama Polytechnic Institute." He was also to formulate the course in scientific agriculture and floriculture. An association of these schools was formed in 1907, which appointed a committee, consisting of the presidents of two schools and the director of the Alabama Experiment Station, to prepare uniform courses of study. These included an agricultural-scientific and an agricultural-classical course, based on an elementary course of seven grades. The former course included agriculture during four years from 3 to 5 hours a week, with an hour of practical work and the sciences of physiography, physiology, botany, physics and chemistry, together with English, mathematics and history. In the classical course Latin during 4 years was substituted for part of the science and agriculture.

In 1908 these schools had substantial buildings, and their plants were valued from \$8,500 to \$59,000. Five schools had from 40 to 55 acres of land, three had 80 acres and one 163 acres. Outside of the State appropriation of \$4,500, their income was from \$1,757 to \$6,755. Their enrollment of students was from 91 to 282 and aggregated 1,364. Their graduates that year were from 6 to 23, with a total of 86. The experimental work carried on by these schools was necessarily simple and largely demonstrational, consisting chiefly of variety and fertilizer tests, rotation of crops and methods of cultivation.

These schools have continued operation on a comparatively modest scale. In 1919 their designation was changed by the legislature to the State Secondary Agricultural Schools of Alabama and they were permitted to qualify for the teaching of vocational agriculture under the terms of the Smith-Hughes Act.

Early Work of the Office of Experiment Stations relating to
secondary education

In 1893 the Office of Experiment Stations in the United States Department of Agriculture began to take a definite interest in agricultural education below the collegiate grade. This is shown by the following extract from the Report of the Director of the office for that year:

The success of the schools of agriculture having a curriculum of lower grade than that of the college, in Minnesota, Rhode Island, and Connecticut, is evidence that there is a demand for institutions which will receive students directly from the common schools and give them training ~~fer~~ in agricultural subjects along with those ordinarily taught in high schools. Experience in agricultural education in this country during the past thirty years shows that colleges of agriculture are mainly for those who have the means and the leisure to gain that liberal education which will fit them to be investigators, teachers, journalists, and managers of large agricultural enterprises. In a word, the colleges are principally useful in training the leaders in agricultural progress. This is a high duty, and its successful performance should entitle an institution to the gratitude and support of the people. But there is need that the masses of our agricultural population should have more ample opportunities for education in agricultural lines.

The experiment stations, through their bulletins and reports, are doing much to educate the adult farmer. The colleges also are doing more each year in what may be called university extension work through farmers' institutes. As the demand for instruction in agriculture increases, the colleges will undoubtedly shape their courses to meet the needs of the farmers as far as this is practicable. We shall then have experiment stations, college courses in agriculture, schools of agriculture, special schools in dairying, animal production, etc., farmers' institutes, and

home readings as the complete system of education for the farmer, carried on under the auspices of the university or college.

This system, however, can not accomplish the most good for the greatest number of our agricultural population until the courses of study in the common and high schools of the rural communities are so modified as to give the farmers' children that elementary training which will enable them to appreciate and apply what the experiment station and the college teach.

The countries of Europe are giving much attention to the elementary instruction of farmers' children in agricultural subjects.

What the European governments are doing the people themselves in their local communities might undertake in this country. By providing that the children in the common schools should learn how to see, to use their hands, and to adapt means to useful ends, and that the farm boy or girl in the rural high school should be taught in outline the theory and practice of agriculture, an improvement might be made in our public school system which would soon show substantial results in more contented and prosperous rural communities.

The report for 1895 followed up the subject as follows:

In obedience to the growing demand for more thorough instruction, our colleges of agriculture are gradually raising the grade of their courses which lead to graduation and degrees. At the same time they are meeting, as best they can, the demand for more widespread elementary instruction in agriculture.

The necessity for a clearer separation between the elementary and higher courses is, however, becoming yearly more apparent. The attempt of the University of Minnesota to maintain a college and a school of agriculture virtually as separate departments has proved a great success. Several hundred students have attended the school of agriculture during the past year. When the people realize more clearly the desirability of separating elementary and higher courses in agriculture, as in other subjects, they will undoubtedly provide means for the establishment of lower schools in which agriculture shall be taught, and at the same time enlarge the resources of the institutions devoted more exclusively to training the leaders in agricultural science.

In an article on popular education for the farmer in the Yearbook of the Department of Agriculture for 1897, after calling attention to the secondary schools of agriculture in Minnesota and Alabama, and commending the establishment of such schools, the Director of the Office of Experiment Stations says:

But it is not believed that these special agricultural high schools will fully meet the needs of our farmers for agricultural instruction of this grade. Any school so distant from the farmer's home as to necessitate long journeys and residence at the school for two or more years must necessarily be too expensive for most of the farmers' children, especially after they have reached an age when their services may be more or less utilized on the farm. What is needed is courses in agriculture in numerous schools to which farmers' children resort, near their homes, to "finish" their education after they are through with the common schools. (578)

The Office of Experiment Stations then undertook an active propaganda in different parts of the country for the introduction of agriculture into the secondary schools, through its publications, addresses at educational and farmers' meetings, correspondence and conferences with educators and others interested in this matter and by cooperation with the Association of Agricultural Colleges, particularly through its committee on instruction in agriculture. In 1901 D. J. Crosby, a graduate and instructor in the Michigan Agricultural College, was added to the staff of the Office of Experiment Stations, as a special assistant to the director in work relating to agricultural education. The more favorable economic conditions of agriculture, the rapidly increasing attendance at the agricultural colleges, the great growth of the farmers' institutes and other causes helped to promote the movement for secondary education in agriculture and it made great advances during the first decade of the twentieth century.

Development of Secondary Education in Agriculture without Federal Endowment 1900 - 1916.

After 1900 the movement for secondary education in agriculture developed rapidly and broadly. It was promoted by Federal, State, county and local agencies. Secondary instruction in agriculture was introduced into public and private colleges and schools of various kinds. Much of the work done by the agencies and institutions interested in this movement was necessarily tentative and experimental. An attempt has been made in the following pages to summarize the leading features of this movement and the early work of typical institutions.

National Agencies for the Promotion of Secondary Education in Agriculture

Office of Experiment Stations

The Office of Experiment Stations in 1902 began to publish a section on the progress of secondary education in agriculture in its annual report and this was continued for ten years. In September 1905 a department of agricultural education was established in the Experiment Station Record. Much information regarding the progress of secondary education in agriculture in this and other countries was collected by this Office and published in its reports or in the Record. The Appropriation Act for the Department of Agriculture passed in 1903, for the first time gave the office specific authority for its work relating to farmers' institutes by providing \$5,000 to be used "to investigate and report upon the organization and progress of farmers' institutes in the several States and Territories and upon similar organizations in foreign countries, with special suggestions of plans and methods for making such organizations more effective for the dissemination of the results of the work of the Department of Agriculture and the agricultural experiment stations, and of improved methods of agricultural practice." This item was amended in 1906 by inserting the words "and agricultural schools" after "farmers' institutes." The appropriation was not increased until 1908 when it was made \$10,000.

Among the special publications of the office on secondary education during the next ten years were those on the American system of agricultural education, a secondary course in agronomy and in animal husbandry, training courses for teachers of agriculture, simple exercises illustrating some applications of chemistry to agriculture, community work in the rural high school, and home projects in secondary agriculture.

The work of the office as a clearing-house of information and advice regarding the courses, personnel, equipment, illustrative material and literature for secondary instruction in agriculture greatly increased. Representatives of the Office were active in meetings of the National Education Association, the American Society for the Advancement of Agricultural Teaching, summer schools for teachers, and other educational meetings and in holding personal conferences with school officers and teachers at schools in different States.

Cooperation with the Association of Agricultural Colleges on matters relating to secondary education mainly through its committee on instruction in agriculture continued to be a feature of the work of the office. Up to 1910 the proceedings of this association were published as bulletins of this office.

The Association of Agricultural Colleges

As the movement for secondary instruction in agriculture progressed the Association of American Agricultural Colleges and Experiment Stations took an increasing interest in this subject and its various phases were discussed at the annual conventions of the association.

In 1902 the report of the Committee on Instruction in Agriculture contained a section on secondary courses in agriculture. The committee recommended the definite organization of schools of agriculture within the colleges as emphasizing the desirability of distinguishing between collegiate and secondary instruction in agriculture.

And under present conditions many of our agricultural colleges may in this way contribute to the movement for the definite organization of secondary instruction in agriculture in the United States. But it is clear that whatever aid existing agricultural colleges may give in this direction, it will be desirable to establish and support special high schools in which instruction in agriculture shall be given. The movement in this direction has already begun and undoubtedly will continue and increase. (697)

It was believed that the special agricultural high schools in Alabama, Wisconsin and California would, if successful, result in the establishment of similar schools throughout the Union, which would probably be under State, rather than local control. But in addition, "the teaching of agriculture should be introduced into the public high schools in or near the rural communities."

Agriculture has thus far been almost entirely neglected in the high-school programmes, and it is high time that the friends of agricultural education should make a systematic effort to have the claims of this fundamental industry acknowledged and satisfied in the curricula of the public high schools. Since successful agriculture is essential to the prosperity and well-being of urban as well as rural communities, there should be cooperation between country districts, villages, cities, and the States to provide for the means for the maintenance of agricultural courses in the high schools. As a practical measure it is believed that such courses may be added to those already existing in many high-schools by the addition of a single teacher, who should be an agricultural college graduate, to the teaching force already supplied. The expense of maintaining this teacher and his equipment may properly be shared by the State, the village, or city maintaining the high school and the country-district from which the pupils from the farms are drawn to this school. The State may properly aid this movement by offering a stated sum annually to high schools maintaining agricultural courses. (697)

At this time where the teaching of agriculture in the public schools was advocated there was insistent demand, especially from school officials, that it should be definitely shown how this could be done without disrupting existing school programs. The committee therefore undertook to show this by examples drawn to illustrate what might be done in the smaller high schools in Indiana, in the medium sized cities of Lowell, Mass. and Des Moines, Iowa, and in the large city of Washington, D. C. Five periods a week of agriculture during four years were substituted in the Indiana course for Latin in the first two years and the elective offered in the third and fourth years. The work of such schools might be carried on by three teachers, one of whom should be an agricultural college graduate and might teach chemistry, botany and zoology, as well as agriculture. He might also act as principal. In the larger schools in the cities mentioned it was shown that agriculture might be introduced as an elective, to be added to the considerable number of electives already offered in these schools.

At the meeting of the association in 1905 the chairman of this committee read a paper on the relations of the agricultural colleges to the public schools. He said that the colleges should study the programs of the public schools, come into close touch with their officers and teachers, provide courses of instruction which would be attractive to school officers and teachers and by summer schools or otherwise seek to bring such persons into direct contact with the system of education represented in these colleges.

Elementary and secondary courses in agriculture and mechanic arts in the public schools were advocated to direct students to the land-grant colleges and prepare them to enter courses in these institutions.

In 1906 the committee reported that it had a subcommittee on secondary courses which was preparing a syllabus for a course for use in the public high schools. This was followed by the publication in 1907 of a secondary course in agronomy as Circular 77 of the Office of Experiment Stations. (Revised edition in 1908). This contained a syllabus of the course, in which "emphasis is not laid upon soil, tillage, drainage and irrigation as such, but upon the relation of soil, tillage, drainage and irrigation to the environment of the plant, namely to light, heat, moisture, air, plant food, and repressive agencies." The agronomist should consider how the farmer may modify the plant's environment economically to accomplish the desired result in the production of a crop. "No less important is the influence of heredity and the practical methods by which plants may be improved." The application of fundamental laws must be made but the extent to which this can be done will depend on what the students know of botany, physiology and chemistry. On this basis an outline of lectures, recitations, demonstrations and laboratory work for secondary instruction in agronomy during a year was given.

At the meeting of the association in 1909 the chairman of the committee read a paper in which he reviewed the status of agricultural education in secondary schools and suggested ways in which such instruction could be developed in harmony with the existing educational systems of the United States. His conclusions were as follows:

Agriculture, including horticulture and forestry, should be a regular part of public secondary education; second, the unity of our educational system should be maintained, but there should be sufficient elasticity of curriculum to meet the various needs of our people; third, the standard of the curriculum of secondary schools having agricultural courses should conform in a general way to those adopted for the general school system of the State; fourth, the standard agricultural courses, whether in the ordinary high schools or in special schools, should not be narrowly vocational, but should aim to fit the pupils for life as progressive, broad-minded, and intelligent men and women, citizens and home makers, as well as farmers and horticulturists.

Some disapproval of separate agricultural schools was expressed in the discussion of this paper but the importance of such schools as finishing or vocational schools and as a means of training teachers of agriculture for the elementary schools was also brought out. Finally the general views expressed in the paper were indorsed by formal vote of the convention and its separate publication was requested. (See Office of Experiment Stations Circular 91.) Later in this meeting a paper was read by Dean E. A. Burnett of the Nebraska College of Agriculture on The Function of the Land-Grant College in Promoting agricultural education in Secondary Schools, in which he favored the establishment of a limited number of agricultural schools in connection with existing high schools favorably situated for serving a large country constituency. Dean Davenport of Illinois stated his belief that vocational agriculture should be put "within walking or riding distance" of every farm boy by creating agricultural departments in the high schools.

In 1910 the association discussed the correlation of secondary and short courses with the four-years' college course in agriculture. This discussion was introduced by a paper by D. J. Crosby of the Office of Experiment Stations, in which he urged that in connection with secondary courses opportunities should be afforded to capable students to enter the regular college courses. He also advocated supervised home-projects during the long vacation for students in schools having a six-months' term. Prof. W. M. Hays advocated secondary schools at all the agricultural colleges to aid in preparing teachers for the lowerschools.

7031

In 1911 the new committee on college organization and policy in its first report advocated the inclusion of secondary instruction by the colleges in a department of agricultural extension but this was strongly opposed. After a long discussion of measures for Federal aid for education pending in Congress the association declared in favor of such aid for public schools of secondary grade providing education in agriculture, home economics, trades and industries, and manual training. This action was reaffirmed the following year.

In 1912 the Committee on Instruction in Agriculture reported on the work of the agricultural colleges in training teachers of agriculture for secondary schools. An account was given of this work in the several States and the existing situation was summed up as follows:

From the best available sources of information it appears that 40 of the agricultural colleges for white students are offering courses designed to train high school teachers of agriculture. In some cases little more than an elective or two in psychology and pedagogy is offered; in others there are summer schools; in others definitely outlined teacher-training courses, with opportunities for broad, general training in agriculture, and for the most approved instruction in education, supplemented by practice teaching under expert supervision. Thirty-

one of the agricultural colleges conduct summer schools in which special opportunities are afforded for the training of teachers, and in 24 of these summer schools courses for high school teachers are conducted. In 33 of the agricultural colleges students in the agricultural course are given opportunities to elect courses in education, and in 13 institutions where there are both colleges of agriculture and colleges of education students in education may elect courses in agriculture.

The dignity to which agriculture has arisen in recent years as a subject of study in public schools is indicated by the fact that 20 of the agricultural colleges now offer courses in agricultural pedagogy, or as it is sometimes called, "industrial pedagogy," in which special attention is given to methods of teaching this new high school subject.

Fifteen of the agricultural colleges have outlined four-year courses for teachers of agriculture, the work of which in many cases is largely prescribed. Two of the colleges have outlined two-year courses for teachers of agriculture, and 3 of them one-year courses. To meet the demand coming from graduates of other colleges and of normal schools, 4 of the agricultural colleges have made provisions for special courses in agriculture to which these graduates may be admitted, and which are usually so arranged that it will be possible to complete the work in one year.

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The committee made the following recommendations:

1. It is the proper function of the agricultural colleges to train teachers of agriculture for public and private high schools, for technical agricultural schools, and for the agricultural and other colleges.

2. The performance of this function by the agricultural colleges will not duplicate the work of the state normal schools, which for the most part are engaged in the training of teachers for the elementary schools.

3. Inasmuch as the great majority of secondary schools giving courses in agriculture will have only one or two teachers of agriculture, students in the course in agricultural education should ordinarily be well grounded in the general principles of the various branches of agriculture, and the colleges should offer general courses in agriculture to meet the requirements of such students.

4. Teachers of agriculture in secondary schools should have not less than 20 semester hours of professional training, including instruction in educational psychology, history of education, pedagogy, and special methods applicable to agriculture in the secondary schools, supplemented by practice in teaching.

If the college of agriculture is connected with a university having a department of education, the pedagogical studies of the candidate in the course in agricultural education may be pursued in that department, which should have at least one professor devoting his time to agricultural education. In separate agricultural colleges a department of agricultural education should be maintained.

5. Definite provision should be made for practice teaching on the part of those preparing to teach agriculture.

6. Inasmuch as the supply of properly trained teachers of agriculture will continue below the demand for some time, the agricultural colleges should make special provision for training teachers already in high school service who desire to fit themselves to become teachers of agriculture in secondary schools. In this work special emphasis should be laid on the acquirement of the subject-matter of agriculture, including both the science and practice. Agricultural instruction of collegiate grade should be offered in summer sessions or through correspondence courses and proper provision should be made for credit for this work on passing suitable examinations. (728)

In 1916 this committee made a study of the relations of the agricultural colleges to the high schools in which agriculture was taught, with special reference to the problem of entrance or college credit for secondary agricultural courses. A report was made on the basis of information received from 2,200 high schools, which was summarized as follows:

These 2,200 schools constitute only about 19 percent of all high schools, but the fact that 97 percent of these schools have introduced agriculture within ten years indicates that the number is likely to increase rapidly in the future.

With the increase in high school courses in agriculture and in the number of graduates from them, come increasing demands upon the colleges of agriculture for entrance credit and college credit in this subject.

At the present time nearly 92 percent of the colleges of agriculture give entrance credits for high school agriculture. These credits range from $\frac{1}{2}$ unit to 4 units.

Only one college of agriculture actually allows credits toward graduation for high school agriculture, and that only by special arrangement. Forty-one of the colleges make no provision of any sort for such advanced credits. The remaining six make some concessions in the way of excusing students from secondary courses in agriculture or permitting them to take examinations.

No college has as yet made class sections to separate those who have had high school agriculture from those who have not.

Many of the college men recognize the fact that the excellent grade of work in agriculture done by a few of the high schools demonstrates the possibility and probability that soon many of the high schools will be in a position to teach satisfactorily much of what is now included in college freshman agriculture.

When such a condition is reached in a large percentage of the high schools in any State, arrangements should be made so to adjust the college and high school relationships as to give candidates for college entrance full credit for all agricultural work satisfactorily done in high school. This may be done by excusing from freshman agriculture students who have covered this work satisfactorily in high school, thus permitting them to take more advanced work.

The apparent reasons why such an adjustment has not already been made are: (1) the relatively small percentage of high schools teaching agriculture, (2) the lack of trained teachers of agriculture, and (3) the lack of supervision of such a character as would result in a satisfactory standardization of courses, methods, textbooks and equipment.

The first of these difficulties is rapidly being removed, the other two can only be removed through the active and cordial cooperation of the agricultural colleges. The apparent functions of the colleges in this connection are:

1. To graduate annually from 1,000 to 1,200 young men with satisfactory training, and an inclination for teaching agriculture in high schools.
2. To assist in developing suitable courses in agriculture for high schools.
3. To assist in selecting and preparing agricultural textbooks, manuals and equipment for the high schools.
4. To cooperate definitely and actively with state departments of education in supervising high school agriculture. (693)

The United States Bureau of Education

This bureau has promoted the teaching of agriculture in the secondary schools by the collection and publication of statistics and other information regarding such work in this country and abroad. For a number of years it has had specialists in rural or agricultural education who have given special attention to this matter and have aided the movement through participation in educational meetings in different parts of the country, as well as by the preparation of publications. Among the bureau's publications relating to agriculture in the secondary schools are the following: Bulletin No. 1, 1908, on the training of persons to teach agriculture, by L. H. Bailey; No. 6, 1912, Agricultural Education in Secondary Schools; No. 2,

1913, Training courses for Rural Teachers, by A. C. Monahan and R. H. Wright; No. 6, 1913, Agricultural Instruction in High Schools, by C. H. Robison and F. B. Jenks; No. 14, 1913, Agricultural Instruction in Secindary Schools; No. 27, 1914, Agricultural Teaching; No. 38, 1917, Vocational Teachers for Secondary Schools, by Chester D. Jarvis; No. 34, 1917, Institutions in the United States giving Instruction in Agriculture, 1915-16, by A. C. Monahan and C. H. Dye; No. 85, 1919, Development of Agricultural Instruction in Secondary Schools by H. P. Barrows.

National Education Association

At the meeting of the National Education Association at Boston, Mass., in 1903 a committee was appointed to investigate and report as to what should be undertaken in the field of industrial education in schools in rural communities. This committee included L. D. Harvey of Wisconsin, L. H. Bailey of New York, Alfred Bayliss of Illinois, W. T. Carrigan of Missouri and W. M. Hays, Assistant Secretary of Agriculture. This committee made an extended report to the association at Asbury Park, N. J., July 3, 1905. (See Experiment Station Record vol. 17, p. 196.) Their general conclusions were

(1) that in existing one-room district schools a limited amount of nature study, elementary agriculture, and hand work for both boys and girls may be undertaken, but that in these schools little can be expected from this work except where enthusiastic and well qualified teachers are in charge; (2) "that in the consolidated school having at least four teachers, one of whom is prepared to teach the elements of agriculture and manual training, and another domestic science, very much more in the field of industrial education may be attempted than in the one-room school, and with far better results;" (3) "that in the township or other distinctively rural high school, and in the village high school attended by a considerable number of pupils from the country" elementary agriculture, domestic science, and other lines of industrial education should be taught by teachers specially prepared for the work; (4) that in view of the success of agricultural or industrial high schools in this country and abroad, such schools should be organized in large numbers in agricultural communities; (5) "that the agricultural colleges and experiment stations have already done much in the formulation of a body of knowledge essential in the field of industrial education, but that more yet remains to be done in putting this body of knowledge into available form for use in elementary and secondary schools, and that effort in this direction should be made a prominent feature in the work of the agricultural colleges of the country;" (6) "that the mastery of such parts of this rapidly developing body of knowledge as is within the capabilities of elementary and secondary school pupils furnishes a mental training unsurpassed in extent and quality by the mastery of any other body of knowledge now regarded as essential in

our common school courses and requiring an equal amount of time, and that for utility of value it is not equaled by any other body of knowledge at present acquired through the expenditure of the same amount of time and effort;" (7) that much needs to be done to educate the people in rural communities to see and appreciate the value of industrial education; (8) "that the courses of study in rural schools should be framed with reference to meeting the needs of the children in those communities, and not with reference to preparing a small percentage of these children to enter higher schools whose courses of study are formulated, not to meet the needs of the great majority of those who attend them, but to prepare the remaining small minority to enter some still higher school;" (9) that it is possible and desirable, without detriment to the present school system, to organize for rural people an articulated series of schools from the elementary school to, and including, the agricultural college; (10) that special opportunities and inducements must be offered to teachers to prepare themselves for giving instruction in industrial subjects; (11) that the organization of boys' and girls' clubs, reading courses, granges, and farmers' institutes should be promoted; and (12) that under existing conditions as to the preparation of teachers for this work "any law making mandatory the teaching of the elements of agriculture, manual training, or domestic science in the entire body of rural schools within a State is unwise, in that the lack of correct information and consequent faulty teaching on the part of the great mass of country school-teachers will tend to bring the whole subject into disrepute and cause a reaction which will postpone the proper development of industrial education.

A similar committee presented a report in 1907.

From this time the association took a more active interest in agricultural education and at Los Angeles in July, 1907, the formation of a department of rural and agricultural education was authorized. This was organized in February, 1908, at the Washington meeting of the department of superintendence with E. C. Bishop of Lincoln, Nebraska, as president and D. B. Johnson of Rockhill, S. C., as vice-president. At this meeting, which was attended by nearly 1,600 persons from every State and Territory, except Arizona, Nevada and Porto Rico, a resolution was adopted endorsing "the great value of the study of agricultural subjects in the schools of the rural districts." Professor W. M. Hays, as Assistant Secretary of Agriculture, gave the principal address at the first evening session, his subject being "Agricultural Industries and Home Economics in the Public Schools." At a round table on agricultural education the educational work of the United States Department of Agriculture was outlined broadly by A. C. True and the training of teachers of agriculture was discussed by Dr. E. E. Brown, United States Commissioner of Education; J. R. Kirk, president

of the State Normal School at Kirksville, Mo.; and K. L. Butterfield, president of the Massachusetts Agricultural College. D. J. Crosby, of the Office of Experiment Stations, read a paper on Cooperation between the United States Department of Agriculture and State School Authorities to Promote Agricultural Education.

The convention of the association at Cleveland, Ohio, June 29 to July 3, 1908, gave unusual attention to vocational education. One prominent educator said that "manual training, domestic science and art, trade, handicraft and agricultural and technical education have dominated the programs and formed the chief themes of conversation." The report of the committee on industrial education contained a section on agricultural education by D. J. Crosby and Superintendent O. J. Kern of Rockford, Ill., in which it was claimed "that adequate facilities for meeting the increasing demand for industrial education must come through schools of secondary type." The department of rural and agricultural education presented its first program at the Cleveland meeting. This included papers on the field of elementary, secondary and collegiate institutions in agricultural education by A. C. True, "What Constitutes Successful Work in Agricultural and Rural Schools" and by B. M. Davis of Miami University, Oxford, Ohio, "The Work of the Normal School in Preparing Teachers to Teach Agriculture" by H. G. Williams, dean of the State Normal College, Athens, Ohio, and "National Aid in Agricultural Education" by Commissioner E. E. Brown. L. H. Bailey gave an address on "Scientific Agriculture in the Secondary Schools" in the department of science instruction, and H. H. Searley discussed the agricultural features of industrial education in the department of normal schools.

At the meeting in Denver in July 1909 much attention was given to agricultural education. Great interest centered in the discussion regarding special agricultural schools. Dean Davenport of Illinois opposed their establishment on the ground that their courses must of necessity be narrow and that the tendency of such schools would be to "peasantize" the farmers. He strongly urged the

teaching of agriculture in the local high schools. D. J. Crosby presented the view of the Office of Experiment Stations that agriculture should be taught in both the high schools and a limited number of special schools. The latter would be especially for mature youth who had decided to follow agricultural pursuits and would have the advantage of greater breadth and thoroughness of agricultural instruction, aided by equipment of laboratories, animals, machinery, etc. superior to that of the ordinary high schools.

By this time the association had come to consider agricultural education as forming a permanent part of our public school system and regular provision was made for the discussion of its various phases at succeeding meetings.

The National Society for the Scientific Study of Education, composed of professors of education and others interested in the study of education, holds annual meetings in connection with the convention of the Department of Superintendence of the National Education Association. Since 1902 it has published yearbooks. One part of the yearbook for 1912 was devoted to papers on "Agricultural education in secondary schools," prepared under direction of D. J. Crosby of the Office of Experiment Stations.

The National Committee on Agricultural Education, organized in 1904 by persons interested in the teaching of agriculture in the public schools, held meetings for several years in connection with the National Education Association, at which matters relating to secondary education were discussed. It was greatly interested in the effort to create a department of rural and agricultural education in the National Education Association. When the department was organized in 1908 this committee went out of existence.

The American Association for the Advancement of Agricultural Teaching

At the meeting of the National Education Association at Boston, Mass.,

July 2-8, 1910, a conference of teachers of agriculture was held, at which the advisability of forming a national association of such teachers was discussed. This was followed by a conference on secondary agricultural education at Chicago, April 10, 1911, which was attended by representatives of the departments of agricultural education in land-grant colleges in Minnesota, Wisconsin, Illinois, Indiana, Michigan and Ohio, the principals of three agricultural schools in Minnesota and the specialists in agricultural education of the New York State Department of Education, the United States Bureau of Education and the Office of Experiment Stations. At this meeting the American Association for the Advancement of Agricultural Teaching was organized, with K. L. Hatch, of the Wisconsin College of Agriculture, as president and W. H. French, of the Michigan Agricultural College as secretary-treasurer. This association has since held annual meetings, usually in connection with the meeting of the Land-Grant College Association, at which many of the problems relating to agricultural education, particularly in the secondary and elementary schools, have been discussed. Some of the papers read at these meetings have been published by the Bureau of Education, in the proceedings of the Land-Grant College Association, or elsewhere.

Secondary Instruction in Agricultural Colleges

The general history of the development of secondary instruction in agriculture in the agricultural colleges has already been described (see particularly pages 69 and 78). This instruction has been organized in two general forms, (1) as a distinct school of agriculture within the college, or (2) as short courses of various lengths and for different purposes. The short courses covering a year or more are to a considerable extent of the same general character as the regular courses in the schools. But the schools as well as college departments also offer special courses covering shorter periods. In 1915-16 the Bureau of Education listed

24 land-grant institutions as maintaining schools or secondary courses of agriculture covering from 1 to 4 years. Schools were maintained in 11 States, as follows: California, Colorado, Connecticut, Idaho, Kansas, Minnesota, Montana, Nebraska, North Dakota, South Dakota and Washington. One-year, two-year, industrial or vocational courses were maintained in 13 States: Iowa, Michigan, Mississippi, New Hampshire, New Mexico, North Carolina, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Utah and Virginia. The schools were "taught in large part by members of the regular agricultural college faculty and the college recitation rooms, lecture rooms, laboratories and equipment are all used. There is little difference in the organization of these so-called 'schools of agriculture' and in the 'one-year', 'two-year', 'industrial' and 'vocational' courses in agriculture in other colleges." (606)

In three States additional schools were maintained away from the colleges, though under its direction. The Colorado College had one at Fort Lewis, the Nebraska College one at Curtis and the Minnesota College two, at Crookston and Morris. The School at Davis, under the University of California, served the double purpose of a secondary school and an institution giving college education in some agricultural subjects to members of classes who did most of their work at the College of Agriculture at Berkeley.

The status of the short courses in 1924 had been described in a previous chapter. (See p.767)

As the number of secondary courses in agriculture in special schools and the high schools increased and it became evident that such instruction would become a permanent part of our public school system, the problem of college credit for such courses arose. In 1905 the council of the University of Missouri initiated the movement for giving credit for high school agriculture on the entrance requirements for college. One unit was allowed for a year's work in agriculture in the high school.

About the same time the regents of the University of the State of New York, who provide uniform examinations for all the high schools of the State, decided to allow credits for nature study and agriculture provided the courses in these subjects showed educational values comparable with those of the other subjects recognized in their examinations. To meet this situation the College of Agriculture at Cornell University, at the request of the New York State Department of Education, prepared a topical syllabus for a high school course in agriculture.

Instruction in Agriculture in Normal Schools

Early in the twentieth century normal schools in a number of States began to teach agriculture. This was closely connected with the movement for the introduction of nature-study and elementary agriculture into the rural schools, which will be described in a later chapter. (p. 895) In Wisconsin the county training schools for teachers in Dunn and Marathon Counties were combined with the schools established in 1902 in which agriculture was taught. And soon thereafter county teacher-training schools in Michigan began the teaching of agriculture. About the same time the State Normal and Industrial College for Women, at Rockhill, South Carolina, began instruction in agriculture in connection with school garden work.

In Missouri the State Normal School at Kirksville in 1900-01 began to give a one-year course in agriculture under the active leadership of the principal of the school, John R. Kirk, who was greatly interested in promoting agricultural education. It was the first attempt to give a systematic course in agriculture at a normal school in the United States. This resulted in 1905 in the publication of a manual and textbook of elementary agriculture, entitled "Agriculture through the Laboratory and School Garden," by Miss C. R. Jackson and Mrs. L. S. Dougherty, instructors in that school. This book shows that the course in agriculture there treated of soils, leguminous plants, propagation and improvement of plants, pruning,

enemies of plants, rotation of crops, principles of feeding, milk and its care and ornamentation of school and home grounds. Suggestions for laboratory exercises and field work and numerous references to the literature of the subject were a prominent feature of this book.

About the same time the normal school at Cape Girardeau began a one-year course, which included one term each of soils and soil management, plant culture and horticultural practice, and home dairying and landscape gardening. R. W. Clothier was teacher of chemistry and agriculture. A little later the normal school at Warrensburg undertook similar work. The courses in agriculture in these Missouri schools were afterwards further developed and covered a longer period.

In Georgia the State normal schools at Athens and Milledgeville early began to develop courses in agriculture.

In 1906-7 at Athens this subject was taught throughout the diploma course of three years and was one of the subjects in the short review course. In the senior year students recited one double period a week on elementary agriculture, which included a review of previous work and a study of methods. The school had a 20-acre farm which furnished food for the students and was also utilized as a laboratory for the classes in agriculture. Students did practical work with different varieties of plants and fertilizers, budding, grafting, spraying, growing of plants in pots, etc. They studied rural-life problems, made detailed studies of a few staple crops grown in the South, and had some instruction regarding live stock and truck farming. At Milledgeville agriculture was a required subject in the freshman year and was followed in the junior and senior years by special courses on plants, animals, climate, weather, soils, etc.

In the Alabama State Normal School at Jacksonville agriculture was taught in 1906-7 in the first and second years and horticulture in the fourth year, with practical exercises in pruning, grafting, etc. The Colorado State Normal School at Greeley about this time required agriculture four hours a week throughout the

eleventh grade of the high-school course and the ninth grade of the normal school course and offered it as an elective in the twelfth grade of the high school course. It was taught by an associate professor of nature study, school gardening and elementary agriculture.

In 1907 the Office of Experiment Stations reported that 64 out of 182 State normal schools in the United States were teaching agriculture.

Of these, 4 are in Alabama, 3 in California, 1 in Colorado, 2 in Connecticut, 2 in Georgia, 3 in Illinois, 1 in Iowa, 1 in Kansas, 1 in Louisiana, 3 in Maine, 3 in Michigan, 5 in Missouri, 1 in Montana, 3 in Nebraska, 1 in North Carolina, 2 in North Dakota, 1 in Ohio, 3 in Oklahoma, 1 in Oregon, 1 in South Carolina, 1 in South Dakota, 1 in Texas, 2 in Utah, 2 in Virginia, 3 in Washington, 6 in West Virginia, and 7 in Wisconsin.

The instruction in agriculture in 13 of these institutions is confined to the text-book, in 35 the text-book is supplemented by laboratory exercises, school garden work, or other practicums, while in the remaining 16 schools the nature of the instruction is uncertain, though it is likely that fully half of these provide practice work.

In 11 of the normal schools agriculture is taught by teachers of agriculture, in 11 by teachers of science, and in the remaining 7 by other teachers - principals, teachers of pedagogy, economics, etc. Fully 70 per cent of all the teachers of agriculture in normal schools were trained for other lines of work, and of the remaining 30 per cent nearly one-half are burdened with other science work. (564)

Oklahoma in the general law of May 20, 1908, for a system of agricultural education, provided \$2,500 annually for a department of agricultural and industrial education in each of the State normal schools. The same year Texas appropriated \$2,000 a year for two years to each of its three State normal schools for departments of agriculture, manual training and domestic science and also made provision for teachers' courses in elementary agriculture in the summer sessions at these schools.

In 1910 the Massachusetts State Normal School at North Adams, with the co-operation of the agricultural college, undertook special work with reference to rural schools, which was extended to cover three years of instruction on problems relating to farm crops, horticulture, poultry and dairying.

In New York, after the passage of a law giving State aid to schools organizing departments of agriculture, home economics and manual training, the State Normal and Training School at Cortland in 1911 offered two-years and one-year courses for men with instruction in agriculture and allied sciences, psychology and education.

The normal schools, as well as the agricultural colleges, in a number of States offered short summer or winter courses in agricultural subjects, with special reference to the needs of teachers in service. A unique summer school of this kind, apart from the normal schools, was held at Cape May, New Jersey, August 6-31, 1908 under direction of Mr. H. O. Sampson of the Office of Experiment Stations. The instruction was carried on by lectures, laboratory demonstrations and field trips. Special effort was made to show how elementary instruction in agriculture could be effectively given without expensive apparatus and with the use of a school garden and of livestock on neighboring farms.

Some normal schools also undertook to interest farmers in their agricultural work by holding meetings at the school. For example, in 1909 normal schools in Illinois held institutes or farmers' weeks, in which there were lectures by Dean Davenport of the College of Agriculture and others, exercises in judging corn, horses or dairy cows, testing milk, etc. In Michigan the Central State Normal School at Mount Pleasant held a five days institute in which members of the faculties of the school and the agricultural college participated, as well as a representative of the State grange. In Missouri the State Normal School at Cape Girardeau conducted a boys' short course for six weeks and a farmers' course of about 10 days.

The number of normal schools in which agriculture was taught increased rapidly. In 1910 some instruction in agriculture was given in 156 State and county normal schools. This movement was thereafter affected by the increasing attention to teacher-training in the agricultural colleges, the introduction of agriculture in numerous high schools and the difficulties attending efforts to introduce this sub-

ject in the rural elementary schools. It became more difficult for normal schools to offer acceptable courses in agriculture, as distinguished from nature-study, unless they had teachers well trained in agriculture. Some normal schools therefore dropped agriculture, while in others the courses in that subject were made more systematic and stronger.

For the year 1915-16 the Bureau of Education reported that 124 public normal schools were teaching agriculture, not including 27 county training schools in Wisconsin. These schools were located in 37 States and offered instruction in agriculture ranging from 20 to 1,512 recitation hours. In 49 schools from 20 to 190 hours of agriculture were required of all students.

Teacher training in local academies with State aid began in New York in 1834 when \$500 was given to 8 schools. This was increased to \$700 and the number of classes reached a maximum of 267 in 1895. In 1914 there were 113 classes with 1,777 students but in 1923 only 54 classes and the directors of the rural-school survey recommended discontinuance but the legislature increased State aid to \$1,200. After 1900 such teaching spread rapidly in high schools and in 1924 existed in 23 States. In 1922-23 there were 1,712 classes with 30,947 students (including about 2,000 boys.) Ten States had a two-years course, 8 a course in senior year, and 5 a graduate course. Rural sociology was required in 12 States, and rural economics in 1; industrial arts, including agriculture, in 13 States; and nature study in 13 States.

State Agricultural Schools

Under an Act of March 8, 1901, the California Polytechnic School at San Luis Obispo, was opened in 1903, with agriculture, domestic science and mechanic arts as its main lines of instruction. Two substantial buildings were erected on a farm of 280 acres and Leroy Anderson who had been an instructor in the College of Agriculture of the University of California was made its director.

A joint meeting of the California State Teachers' Association and the State Farmers' Institute was held at Berkeley, December 25-29, 1905, and was attended by over 7,000 persons. (Experiment Station Record vol. 17, p. 521.)

The claims of agricultural education to a place in the public school system in secondary and elementary schools, as well as in the college, were elaborately and earnestly presented and discussed by a considerable number of speakers. More significant even was the general atmosphere of sympathy with the idea that the industrial element must in one form or another become a permanent and pervasive constituent of our public school system.

Governor Pardee in an earnest and thoughtful address showed that there was so little in the school curricula to aid children in their life work that great numbers of them, and especially the boys, were leaving school at so early an age that the schools were making little impression on their minds or characters. The problems of agricultural education were discussed by a number of speakers, including representatives of the University of California and the Director of the Office of Experiment Stations. The need of supplementing the work of the College of Agriculture of the University by the teaching of agriculture in the high schools and in a small number of special secondary schools was clearly pointed out. The press of the State gave much space to this meeting and particularly to its agricultural features. It was an important factor in bringing about increased attention to agriculture in high schools and in securing the establishment of the agricultural school at Davis in connection with the College of Agriculture of the University of California.

In 1907 the legislature appropriated \$132,000 for the equipment of a farm there and the erection of buildings. A dairy building, live stock pavilion, barn, workshops and two cottages were soon erected and a short course was begun in January 1908. Dr. Leroy Anderson was transferred from the Polytechnic School at San Luis Obispo to be professor of practical agriculture in the University of California and director of the farm school at Davis. The school was developed partly as a secondary vocational school to meet the needs of mature farm boys who were not prepared to enter the College of Agriculture and partly to provide practical instruction for the members of the college classes in agriculture who could not get such instruction at Berkeley because the college of agriculture then had no farm.

In Minnesota an act was passed in 1905 creating a school of agriculture at Crookston and putting it under the direction of the board of regents of the State university. An appropriation of \$15,000 was made for the construction and equipment of a school building to be located on the farm of 476 acres belonging to the branch experiment station which has been maintained there since 1895.

The State also gave this school an initial appropriation of \$4,000 annually for maintenance. In 1908 a dormitory costing about \$43,000 and a building containing a creamery, and blacksmith and carpenter shop, costing about \$15,000 were erected. In 1911 a science hall costing \$40,000 and later other substantial buildings were added. This school prospered and in recent years has had 500 students.

In 1910 a similar school was located at Morris, which in 1924 had 10 brick and stone educational buildings and 10 farm buildings. These two schools are coeducational, are conducted on the same general plan as the school at the agricultural college, and are in effect branches of that institution. Their school year covers six months from October to April.

Georgia in 1906 under the leadership of Governor Joseph M. Terrell undertook the establishment of industrial and agricultural schools in each of the eleven Congressional districts of that State. (164) The legislature passed an act under which the governor was authorized to establish such schools and cause them to be maintained. They were to be branches of the State College of Agriculture and under the general supervision of the board of trustees of the University of Georgia, but each school was to have a local board of trustees appointed by the governor for a term of six years and consisting of one member from each county in its district. These boards were to cooperate with the governor and the faculty of the State College of Agriculture in deciding upon courses of study and lines of farm work to be carried on. Each school was to receive for maintenance an equal share approximately of the inspection fees from fertilizers, oils, etc. collected by the State department of agriculture, not otherwise appropriated, amounting as then estimated to about \$6,000 a year. The different localities in which the schools were located must furnish not less than 200 acres of land and the necessary equipment of buildings, live stock, machinery, farm implements, etc.

The course of study in said schools shall be confined to the elementary branches of an English education, and practical treatises or lectures on agriculture in all its branches, and the mechanic arts and such other studies as will enable students completing the course to enter the freshman class of the State college of agriculture on certificate of the principle. (164)

The faculty was to consist of a principal, "who shall be an intelligent farmer," a superintendent and instructor in farm work, an intelligent mechanic, a "practical instructor in care of stock and dairying," an instructor in English and such other instructors and assistants as funds would permit. "It shall be the duty of said instructors in said schools to cooperate in conducting farmers' institutes and farm and stock demonstrations."

After the first temporary buildings were erected,

all work on, in and about said schools, or on or in the barns and shops connected with said schools, whether it be farming, building, care of stock or work of whatever kind shall be performed exclusively by the students of said schools. (164)

One half of the receipts from the sale of the products of the farm or shop must be used to pay the students, not to exceed \$100 for each student in a school year. Tuition was to be free.

The trustees of the university decided that the schools should be coeducational, the minimum age for entrance to be 14 years for boys and 13 for girls, and that the course should cover four years of forty weeks each. Manual or laboratory work was to occupy three hours daily. The girls were to have instruction and work in home economics. About one-fourth of the students were to be required to stay on the school farm during the summer vacation and work for pay.

So popular was the movement to establish these schools that gifts from private sources in the several districts aggregated in value over \$800,000. They included from 240 to 350 acres of land for each school, valued at from \$5,000 to \$22,000, cash donations of from \$25,000 to \$60,000, 10 years of free telephone and water service in more than half the districts and installation of sewerage systems in several districts.

At the request of the governor the Secretary of Agriculture detailed W. G. Smith of the Bureau of Soils to aid in the selection of the school farms and D. J. Crosby of the Office of Experiment Stations to assist in formulating the course of study. The latter and Joseph S. Stewart, professor of secondary education in the University of Georgia, prepared a tentative course, which was examined by a committee of the board of trustees, submitted to professors of agriculture in a number of States and with some changes, especially the elimination of optional foreign languages, was adopted June 15, 1907. This course included class and practice work in agriculture and English during four years, to-

gether with arithmetic, United States history, penmanship, spelling and geography in first year; algebra, ancient history, horticulture and botany, penmanship and spelling, or an optional study in second year; algebra, rural law and farm accounts, elementary and agricultural physics, English history, commercial geography or a science in third year; geometry, civics, farm economics, elementary and agricultural chemistry, modern history or a science in fourth year; $79\frac{1}{2}$ hours were given to classroom and practice work in agriculture and $50\frac{1}{2}$ hours (or 76 periods of 40 minutes) to the other subjects. General plans for buildings and grounds were furnished by an architect at Atlanta and it was intended to construct first a main building and dormitories for boys and girls, which were to be brick structures with two stories and a basement.

The schools were located at Statesboro, Tifton, Americus, Carrolton, Monroe, Barnesville, Powder Springs, Madison, Clarksville, Granite Hill and Douglas.

Work on these schools progressed rapidly. All of them were in operation in 1908 and during that school year enrolled 1,001 students. From one to four of the buildings originally planned had been erected at each school. The academic buildings had six class rooms, chemical, agricultural and biological laboratories, and an auditorium with 600 seats. Barns, stables, dairies, laundries, etc. were erected by student labor at several of the schools. The buildings gradually increased in number and were better equipped; the school grounds were made attractive and were fitted up for various forms of athletics; the farms were improved and better utilized for instruction and for the production of food supplies for the boarding students.

In 1911 the funds derived from the fertilizer tax were withdrawn from these schools and they were given an annual appropriation from the State treasury. In 1915-16 this amounted to \$10,000 for each school. That year they each had 4 or 5 men teachers and from 2 to 6 women teachers. The students numbered from 45 to 145 boys and from 12 to 75 girls. For a number of years these schools encountered

many difficulties owing to the experimental stage of vocational education and the opposition or indifference of school authorities and people generally to such education. But their courses of study were gradually improved and standardized and they became high schools whose graduates were accredited for college entrance, particularly to the College of Agriculture of the University of Georgia. After the passage of the Smith-Hughes Vocational Education Act in 1917 these schools secured an allotment of funds provided under that act.

New York established its first State School of Agriculture in 1906 and located it at St. Lawrence University at Canton. This university was established in 1856 as a denominational institution and had developed a college of arts and sciences and schools of theology and law.

The school of agriculture was intended to meet the needs of young people who had not taken the regular high school courses and thus prepared themselves to enter a college of agriculture. It was expected that this new school would be quite strictly vocational. Agriculture, mechanic arts and home economics would be taught, together with the elements of underlying sciences and a few academic subjects. An appropriation of \$80,000 for buildings and equipment and \$12,000 for maintenance was made at first. A main school building and a dairy building were erected and the school was opened in 1907. A farm of 63 acres was immediately used and this was changed for a farm of 100 acres in 1910. The early faculty consisted of a dean and teacher of animal husbandry and dairying, and teachers of farm engineering and manual training, domestic science, chemistry and physics, and academic subjects, with assistants in cheese and butter making, poultry, veterinary science, and some other subjects. There was also a farm superintendent. The agricultural course of two years included agronomy, animal husbandry, dairying, poultry, veterinary science, farm engineering, surveying, agricultural chemistry, physics, manual training (mechanical drawing, woodworking and forge work), agricultural arithmetic, farm accounts, English, civics, political economy,

commercial and parliamentary law. Students must be at least 16 years old and there were no entrance requirements. A class of six members was graduated in 1909.

Attendance at this school grew and it was found necessary to make a distinction between those students who had had only common school education and those who had taken at least a part of a high school course. For the former a regular course of 3 years was offered, while the latter might so arrange their studies as to graduate in two years. During the second and third years agricultural students might specialize to a certain extent in animal husbandry, poultry, dairying or horticulture.

In 1908 two other New York State schools of agriculture were established. One of these was located at Alfred University, Alfred, and the other by itself at Morrisville.

Alfred University had grown out of a small school organized in 1836, which in 1843 received a charter as Alfred Academy and Teachers' Seminary. In 1857 it was made a university and added an undergraduate college to the academy. The New York State School of Clay Working and Ceramics was established on land adjacent to the university and is managed by its trustees.

The School of Agriculture was given a board of managers appointed by the university trustees. Dr. R. A. Pearson, State Commissioner of Agriculture, L. H. Bailey, director of the State College of Agriculture and F. N. Godfrey, Master of the State Grange were members of the first board of managers. The initial appropriation provided \$75,000 for buildings, farm and equipment and \$5,000 for maintenance, to which were added in 1909 \$40,000 for a dairy building, greenhouse and other equipment and \$10,000 annually for maintenance. The main building was a four-story structure of brick and stone, containing 10 laboratories, classroom, assembly room and library. There was a farm of 230 acres, with a dormitory for 20 boys, a large barn and 50 cattle.

The faculty included the president of the university, who was also teacher of rural sociology and ethics, Dr. O. S. Morgan, director and teacher of horticulture and agronomy, and teachers of animal husbandry, domestic science and arts, drafting and shopwork, chemistry and physics, botany and zoology, and farm mathematics, and a farm superintendent. The regular course occupied three years but there were also special courses and a farmers' week. Students in the university were permitted to take some studies in this school.

A novel feature of its 3-years course was its arrangement under three heads, viz., for boys, for boys and girls and for girls. The work under the first and third headings was almost evenly balanced in time units and among the technical studies common to boys and girls were general agriculture, general and agricultural botany, farm law and accounts, rural sociology, butter, cheese, poultry, plant diseases, general and landscape gardening, and insect pests. Besides English, arithmetic, history and hygiene, instruction was given in physical culture, music, parliamentary practice and social life.

The school opened October 18, 1909, and had 2 terms of 12 weeks each. 36 boys and 10 girls attended the first year. In 1912-13 there were 173 boys and girls in the school, and in addition 46 students came from the college and academy.

The school at Morrisville opened October 26, 1910, and under the law was for "the elementary and practical instruction of pupils attending such school of agriculture and all allied branches, including domestic science, conducting investigations in Central New York for the purpose of ascertaining the best methods of fertilizing field, gardens and plantations; and the best modes of tillage and farm management and the care and management of livestock." (418) It was thought at first that all the State agricultural schools in New York would do considerable experimental work but this has actually been a very minor part of their work and has mainly included comparatively simple tests and demonstrations. The supervisors of Madison County were authorized to transfer county seat buildings at Morrisville

for use of the school, which was given \$20,000 for repairs and the purchase of a farm of about 200 acres. In 1910 the State gave \$59,275 for buildings, equipment, teachers and maintenance. The school thus acquired 3 substantial buildings, one of which was used for shops and drafting. It was managed by a board of six trustees appointed by the governor, together with the Commissioner of Agriculture and the Director of the State College of Agriculture as members ex-officio. The first course covered two years and in 1911-12 was attended by 26 boys and 6 girls.

A State act of 1910 authorized the three agricultural schools then established to give courses for the training of teachers of agriculture, mechanic arts and home making. If they gave such courses they were to receive the same State aid as was given to high schools under this law.

Additional State schools of agriculture were afterwards established at Cobleskill (1916), Delhi (1914), and Farmingdale (1916). The latter is on Long Island about 30 miles from New York City. It has been given larger funds and has a more elaborate plant. Special efforts have been made to draw students from the city and a considerable number of these have been children of foreign-born parents who in their native countries lived on the land.

The first constitution of Oklahoma required the teaching of the "elements of agriculture, horticulture, stock feeding, and domestic science in the common schools." An act of May 20, 1908, passed by the first State legislature provided for an articulated system of instruction in the subjects mentioned and in forestry, roadmaking and economics, extending from the agricultural college to the common schools. The Agricultural and Mechanical College was required to assist in promoting the teaching of agricultural and industrial subjects in the lower schools; departments of agricultural and industrial education were to be established in the State normal schools, and agricultural schools of secondary grade were to be organized one in each judicial district, whose courses were to include not only agricul-

tural and industrial subjects but also "the common-school branches, languages, manual training, manufactures, the sciences and other necessary studies." At least two of these schools were to be established in 1908-9, and two each year thereafter. Each school must provide not less than 80 acres of land for experimental purposes, without expense to the State. The State superintendent of education, president of the State Board of Agriculture and president of the Agricultural and Mechanical College were constituted a commission of agricultural and industrial education to prepare detailed courses of study for these schools and to articulate these courses so that their graduates could enter the Agricultural and Mechanical College without further examination.

There was also to be established at the agricultural college a chair of agriculture for schools, whose occupant was to visit the schools in which agriculture was taught and give advice in this way and through correspondence and publications on all matters relating to the teaching of agriculture and allied subjects. Under this law schools were located at Warner, Tishomingo, Broken Arrow, Lawton, and Helena. The first year each had a State appropriation of \$20,000 for buildings and \$12,000 for maintenance. A sixth school, known as the Panhandle Agricultural Institute, was established at Goodwell, to serve part of a district and had \$12,000 for buildings and \$5,000 for maintenance. One fourth of the maintenance for each school must be spent for experiments.

In Arkansas the movement for agricultural schools began in 1906 when the Washington County Farmers' Union passed a resolution endorsing the establishment of special agricultural schools. A bill for one school was passed by the legislature in 1907 but was vetoed by the governor. On April 1, 1909, a law was approved for four State agricultural schools in districts of from 17 to 20 counties. The management of each school was assigned to a district board of 5 "intelligent farmers", appointed by the governor for a term of 10 years after the initial appointments which were from 2 to 10 years, so that there would be one vacancy to be

filled every two years. The minimum age of admission of students was fixed at 15 years.

The course of study shall be provided by the trustees of each school and shall consist of at least practical experiment, treatises or lectures on agriculture and horticulture, and as soon as practicable and not later than one year succeeding the opening of each school there shall be established in connection therewith a textile school in which shall be taught the art of cotton manufacturing, and other textile manufacturing, should the board of trustees deem it expedient.

The faculty of each school shall consist of a principal, who shall be a graduate of some reputable school of agriculture; one instructor in stock raising and dairying; a competent textile instructor and assistants as may be necessary. The trustees may combine the duties of any of the above when practicable.

That after the first buildings are erected and are ready for temporary use all work in, on and about said school, or on the farm, or on or in the barns connected with such schools, whether it be farming, building, care of stock, or whatever kind of work, shall be performed by students of said school under such regulations for the proper divisions and alterations in such work as may be provided by the trustees.

* * *

The several agricultural schools provided for by this act shall cooperate by reporting to each the results of their several experiments and shall mutually agree upon the publication of such bulletins for free distributions as they may deem to the best interests of those engaged in agricultural pursuits. (125)

This act carried an appropriation of \$40,000 for each school. The communities in which the schools were located contributed generously for lands, buildings and maintenance. Agriculture and horticulture, home economics, natural sciences and academic subjects, such as are usually taught in high schools, were included in their courses. The regular courses covered four years of secondary work but provision was also made for preparatory and short courses.

The schools were opened for students during 1910 and 1911. Each school had in 1912 from 200 to 500 acres of land and from 3 to 6 substantial brick buildings, including a main building (with classrooms and laboratories), dormitories for boys and girls, a dining-hall, etc. The faculties consisted of a principal and from 5 to 10 teachers. The teachers of different branches of agriculture were from the land-grant colleges in Alabama, Arkansas, Illinois, Iowa, Kansas, South Carolina, and Texas.

Various field crops, fruits and vegetables were grown on the farms, where the students did much of the labor and were paid from 10 to 15 cents per hour. In some cases they also assisted in the construction of buildings. The order and content of the agricultural instruction varied in details in the several schools, but in general covered in an elementary way agronomy, animal husbandry, dairying, farm buildings and machinery, fruit and vegetable growing, farm accounts and farm management. Agricultural chemistry, plant and animal diseases and insect pests were also considered. General physics, chemistry, botany, zoology and physiology, together with English, algebra, geometry, trigonometry, surveying and civics were also taught. The girls had home economics instead of agriculture.

These schools developed strongly as vocational institutions. Their agricultural equipment of livestock, farm machinery, etc. increased and their agricultural courses were strengthened. In 1915-16 the number of boys in the secondary agricultural classes in the several schools was as follows: Jonesboro, 67; Russellville, 98; Magnolia, 42; and Monticello, 78.

The Nebraska legislature in 1910 appropriated \$100,000 for an agricultural school to be located at Curtis on a 20-acre campus within the city limits. It also had for demonstration and other purposes a 413-acre farm. It was developed under the direction of the University of Nebraska and was considered a branch of its college of agriculture.

In 1910 the Vermont legislature passed a bill discontinuing the State Normal School at Randolph and transferring its buildings and other property to a new State school of agriculture, which was also given \$20,000 for buildings, repairs and equipment and \$10,000 annually for maintenance. The course covered two years. In 1915-16 this school had six teachers and 78 boys as students.

Colorado in 1911 provided a school of agriculture and mechanic arts at the Fort Lewis School formerly a United States Indian School. This school was to be in charge of the State board of agriculture, and thus was brought into connection with the State Agricultural College at Fort Collins which was also managed by this board. It was to receive a State fund of \$75,000 during the biennium, not less than half of which must be expended for equipment. In 1915-16 this school had a plant valued at \$200,000, received \$30,000 from the State, spent for maintenance \$17,644, had 3 men and 2 women as teachers and 27 boys and 10 girls as students.

County Agricultural Schools

Wisconsin in 1901 took new and important action by establishing county agricultural high schools. The early history of this movement has been described by Dean W. A. Henry of the College of Agriculture of the University of Wisconsin in the Annual Report of the Office of Experiment Stations for 1902, and by Dr. K. C. Davis in the report for 1904. (564)

The great popularity of the short courses in agriculture at the State University had impressed educators and others in the State with the need for providing facilities for training young farmers nearer home. A similar need with reference to the training of teachers for the rural schools also existed because the State normal schools were not able to train many teachers for the schools near the farms. In 1899 the legislature passed a law permitting two counties to establish teacher-training schools and granting State aid to these schools. Two years later 4 more such schools were authorized and the State allowance was doubled, making it \$2,500 for each school, later increased to \$4,000. At the same time a requirement was made that all school teachers should be examined in the elements of agriculture.

In December, 1898, L. D. Harvey, State Superintendent of Education, advocated the establishment of county agricultural schools at the meeting of the State Teachers' Association and in 1899 the legislature directed him to investigate and report

on instruction in manual training and agriculture in other countries and States. He prepared a report and a bill for county schools of agriculture and domestic science which was passed in 1901.

This act ~~was~~ authorized county boards to establish schools of agriculture and domestic economy in which shall be taught the elements of agriculture, farm accounts, manual training, domestic economy and other subjects. Each such school must have at least 3 acres of land suitable for experiments and demonstrations. Completion of the course of study in the common schools was required for entrance to the county schools but winter classes for "students of advanced age" must be organized whenever there was sufficient demand for them. The State Superintendent of Education with the advice of the dean of the State College of Agriculture must prescribe the course of study and determine the qualification of teachers for these schools, which were to be managed by county boards. Not more than half the amount expended for instruction was to be paid by the State, which practically fixed a maximum allowance of \$2,500 for each of the two schools first established. Two counties might unite in the establishment and conduct of a single school.

Marathon and Dunn Counties, which had been first to have county teacher-training schools, under an act of 1899, were also first in organizing schools of agriculture and domestic economy in 1902. Such schools were combined with the county normal schools at Wausau and Menominee.

Substantial brick buildings, costing with equipment \$16,000 to \$20,000, were provided by the counties. The Dunn County school had also a building for mechanic arts and a horticultural building, and farm tool house. Each school had about 6 acres of land. Agriculture, blacksmithing, and carpentry for the boys and home economics for the girls, were combined with English, United States history, civil government, arithmetic, farm accounts, mechanical drawing, and elementary science in a two-years course. The faculties included a principal and teacher of agriculture, and teachers of manual training and home economics. These teachers also gave instruction in the academic subjects.

Instruction was given through lectures and textbooks, with laboratory and field practice, stock-judging, dairy practice, construction of articles for the farm and home, cooking, sewing, garment making, laundering, etc. The agricultural school interchanged classes with the teacher-training school when located in the same building.

A similar school was opened at Winneconne, November 4, 1907, with K. L. Hatch, who had been superintendent of schools at Waterloo, as principal and teacher.

In Minnesota a State act of 1905 gave the counties local option regarding the establishment of county schools of agriculture and domestic economy if the people took interest enough in the matter to vote upon it. Each school must have not less than 10 acres of land for experiments and demonstrations. Such schools were put under the control of the State Superintendent of Education.

Kansas had had for several years a general law permitting the establishment of county high schools. One of these schools was established in Norton County and in 1905 substituted an agricultural course for its general science course and employed a graduate of the Kansas Agricultural College to teach agriculture and the natural sciences.

The Michigan legislature in 1907 passed an act authorizing the establishment of county agricultural schools under the control of county boards of five members, including the county commissioner of schools and four members appointed by the board of supervisors. These schools were to have a two-years course, including agriculture, farm accounts, manual training, home economics and other related subjects and must have at least 10 acres of land. General supervision of these schools was committed to the State Superintendent of Education, with the advice of the president of the State Agricultural College. Their principals must be graduates of state agricultural colleges. The first school under this law was opened at Menominee, November 18, 1907, with J. F. Wojta, formerly connected with

the Minnesota School of Agriculture, as principal. Recently this has been discontinued as a county school.

A Mississippi law, passed in 1908, permitted counties to establish agricultural high schools for which a tax not to exceed 2 mills might be levied. When a school is located and has school and dormitory buildings to accommodate at least 40 pupils in its high school department, the State will give it \$1,000 on the approval of the State Superintendent of Education. Within a year 15 counties had located schools under this law, the first being at Mashulaville in Noxubee County, with a tax of 1 mill.

In North Carolina a law of March 3, 1911, provided for county farm-life schools. These schools must be outside of any city or town of more than 1,000 inhabitants and not within 2 miles of any city or town of more than 5,000 inhabitants. The county, township or school district, or all these combined must provide at least \$2,500 a year for maintenance, a school building, dormitories for not less than 25 boys and girls, a barn, a dairy building with equipment, and a farm of not less than 25 acres of good land. The teachers must have high-school teachers' certificates on all required subjects except Latin, Greek and modern languages. Men must have certificates from the State board of examiners and the president of the North Carolina College of Agriculture and Mechanic Arts attesting to satisfactory qualifications for their special work. The women must have similar certificates from the State board and the president of the State Normal and Industrial College. Provision must be made for regular secondary courses in agriculture and home economics and also for extension work and short courses for adult men and women. One school in each county meeting these requirements may receive a State fund of \$2,500 annually for maintenance but not more than 10 schools may be established in any one year. In 1915-16 the Bureau of Education reported 18 such schools with an attendance of from 6 to 25 boys.

In general, the county has proved to be too small a unit for the adequate maintenance of a special agricultural school.

State Aided Local High Schools

In addition to appropriations for State, district or county agricultural schools, certain States undertook to provide funds for local high schools in which agriculture was taught.

Virginia in 1906 undertook the encouragement of the establishment of high schools in rural communities with a State appropriation of \$50,000 annually. This was doubled in 1908 and in addition \$15,000 was appropriated for county teacher-training courses in certain high schools. The same legislature also gave \$20,000 to be divided equally among 10 high schools, namely one in each Congressional district, for the teaching of agriculture and home economics. Manassas offered \$25,000 and 15 acres of land and was the first town to receive the State appropriation. Appomattox came second with \$5,000 by private subscription and a promise to erect a \$10,000 building and provide all the land desired for the school. Schools at Burkeville, Chester, Cortland, Elk Creek, Hampton, Lebanon and Middletown also received a share of this appropriation. In 1910 the State appropriation for this work was increased to \$25,000. To promote the development of the agricultural work of these schools "The Virginia Association of Agricultural Schools" was formed November 24, 1909, with the Director of the Virginia Experiment Station as secretary-treasurer.

In 1908 Texas appropriated \$32,000 to provide a fund from which the State Board of Education was to duplicate amounts, not less than \$500 nor more than \$2,000, that shall have been appropriated by the trustees of any common school district or independent school district to the establishing, equipping and maintaining of departments of instruction in agriculture, including courses in manual training and domestic economy, "subsidiary to agriculture." The school boards must provide laboratories for instruction in botany, zoology and other sciences related to agriculture and land for the production of farm and garden plants and employ a teacher trained in agriculture and allied branches. This measure was in-

tended primarily to stimulate the establishment of agricultural courses in the public schools and it was therefore provided that State aid should not be given more than twice to the same school.

About this time the legislature of Louisiana passed a law for the encouragement of agricultural teaching in high schools and voted \$500 to each school maintaining a course approved by the State Board of Education. This was afterwards modified so that such schools were divided into two types. Schools of type 1 must have from 5 to 10 acres of land for practical agricultural instruction and were granted annually \$1,200 of State money; those of type 2 must provide practical instruction through home projects and were granted \$400. In 1915-16 there were 42 schools of type 1 and 28 of type 2.

In Minnesota the Putnam Act in 1909 provided not to exceed \$2,500 for each of 10 high or consolidated rural schools which maintained agricultural and industrial departments, with teachers trained in agriculture, manual training and domestic science and not less than 5 acres of land. Not to exceed 10 schools might be added to the list during each biennium. This act was amended in 1911 to permit 30 schools to receive this State fund. There was also passed the Benson-Lee Act giving \$1,000 annually to each of 50 high schools or graded schools maintaining a course in agriculture and a course in home economics or manual training. The State high-school board, which was charged with the administration of this act required that a trained agricultural teacher should be employed and given not less than a continuous half day for agricultural work, with a room exclusively for his use. Two satisfactory daily periods in an agricultural subject would count as a credit. The agricultural instruction must include textbook and laboratory work, special work of local interest, a winter short course and cooperation in farmers' institutes. Under these acts 129 schools had agricultural courses in 1915-16.

In Maine a law enacted in 1909 provided that any incorporated academy maintaining a course in manual training, domestic science or agriculture approved by the

State superintendent of schools might receive annually from the State a sum equal to that expended for such instruction up to \$250 for each course. This act was amended in 1911 to make it apply to high schools, as well as academies, and to allow reimbursement for two-thirds of the expenditures for such instruction up to \$500 annually.

Maryland in 1910 provided State aid for agriculture, home economics, manual training and business courses in two classes of high schools. Schools with at least 80 high-school pupils and a four-years course would receive \$400 toward the salary of each of two special teachers, and schools with at least 35 high-school pupils and a three-years course would receive \$400 toward the salary of one special teacher. Nine high schools giving instruction in agriculture received State aid in 1911.

The New York Education Law of 1909 as amended in 1910 provided that schools of agriculture, mechanic arts and home making may be established in cities or in union free school districts. (418) These schools were for "pupils who have completed the elementary school course, or have attained the age of 14, or who have met such other requirements as the local school authorities may have prescribed." The Commissioner of Education was authorized to grant \$500 annually to such schools maintained for 38 weeks, employing one full-time teacher, having an enrollment of at least 25 pupils and maintaining a course approved by him, and \$200 for each additional teacher similarly employed, or pro rata amounts to schools having a shorter term. This act was afterwards amended to allow 2/3 of the salary of the special teachers to be paid by the State. The State Education Department committed the administration of this law to its Division of Trades Schools and it was ruled that departments or courses as well as separate schools might be given State aid under this law. Mr. F. W. Howe, formerly connected with the Office of Experiment Stations, was appointed supervisor of agricultural education.

In 1913 the law was amended to permit the organization of part-time, continuation or evening vocational schools, to reduce the necessary school year to 36 weeks and the enrollment to 15 pupils, to permit the employment of vocational teachers for 12 months and to increase the maximum State allowance to each teacher to \$1,000 per annum. That year the State supervision was committed to a Division of Vocational Schools in which Mr. L. S. Hawkins was the specialist in agricultural education. (348) Suggested four-year courses in agriculture for intermediate and high schools were outlined and "there must be provision for two weekly laboratory exercises of ninety minutes each in each class taught by the agriculture teacher." A definite plan for home project work was published and it was announced that "no credit is to be given for any subject in agriculture until a satisfactory project for that year has been carried out by the pupil seeking such credit." Additional regents credit may be given for a project of sufficient importance, when this is "summed up, in a carefully written thesis which presents a complete discussion of the problem or experiment undertaken, the scientific facts and principles involved, and the practical results accomplished." When the teacher was employed during the summer a part of his work should be the supervision of home projects of pupils or of boys or young men not in school. In 1915-16 there were 68 State-aided vocational agricultural departments in public high schools in New York.

Massachusetts in 1911 made it possible for a vocational agricultural school to be established in any existing high school by a town or group of towns. Such school approved by the State board of education would receive $\frac{2}{3}$ of the salary of the teacher of agriculture. In 1915-16 there were 14 schools receiving State aid for instruction in agriculture.

In North Dakota in 1911 a law was passed providing that any high, graded or consolidated school having an agricultural department might receive State aid to the extent of \$2,500 provided, however, that the number of schools the first year be limited to five and that not more than five may be added each two years.

To receive State aid the school must employ trained instructors in agriculture, manual training and domestic science and have within one mile of the school building not less than 10 acres of land for a school garden and field demonstration.

In Pennsylvania the new school code of 1911 provided that agriculture shall be taught in township high schools and that a portion of the State school fund may be used "to promote education in conservation, forestry, and agricultural and industrial pursuits." L. H. Dennis was appointed expert assistant in agricultural education in the State Department of Education to supervise the introduction of agriculture into the township high schools. Under a State Act of May 1, 1913, two-thirds of the amount paid for instruction in agriculture might be received by a high school from State funds. In 1915-16 there were 18 schools receiving State aid for teaching agriculture.

In Utah in 1911 the State Board of Education provided that every accredited high school must teach agriculture in order to participate in the maintenance fund provided for such schools. In 1915-16 there were 14 high schools in Utah in which agriculture was taught.

In Wisconsin a State law of 1911 provided for State aid of \$250 for each department of manual training, domestic science or agriculture established in connection with any free high school. In 1915-16 agriculture was taught in 79 high schools in Wisconsin.

The Michigan Agricultural College, which established a department of agricultural education in 1908 with Professor W. H. French, formerly deputy superintendent of public instruction, in charge, actively promoted the teaching of agriculture in the high schools in the State. As a result such instruction was soon offered in a number of schools which were able to obtain qualified teachers. In 1912 a State Commission on Industrial and Agricultural Education recommended the introduction of agriculture into the high schools, with State supervision and financial aid. This was not done but in 1915-16 there were 55 high schools teaching agriculture under the supervision of the State Agricultural College.

Agriculture in Public High Schools without State Aid

About the beginning of the twentieth century local high schools began to introduce instruction in agriculture and by 1915 the number of such schools was large. Brief accounts of a few of these schools are given here to illustrate early types of agricultural work in the high schools which did not receive State aid.

In 1902 the city of Elyria, Ohio, appointed Mr. Lyman Carrier, a graduate of the Michigan Agricultural College, as teacher of sciences in the public high school and arranged an elective course, with agriculture in the third and fourth years.

The high school at Waterford, Pa., which was established in 1800 and had a stone building erected in 1822, organized an agricultural course in 1905 in addition to those in language and science. The school was fortunate in getting as teacher of agriculture Mr. H. O. Sampson, a graduate of the Iowa Agricultural College, who was able to arouse much interest among the students and the neighboring farmers. The course was planned to cover five hours a week for four years. The first year was devoted to a study of the life and uses of plants, the second year to field, orchard and garden crops, the third year to animal husbandry, dairying and soil physics, and the fourth year to the chemistry of soils, plants and animals. Instruction was given through textbooks and lectures (some of which were before the whole school), with agricultural books, bulletins and papers for reference. Much was made of laboratory work and outdoor practicums. The pupils made much of their own apparatus. The school had no land or livestock but used neighboring farms for observation and stock judging. Farmers often brought animals to the vicinity of the school house to be studied by the agricultural pupils. Mr. Sampson soon left this school to take up work in the Bureau of Soils at Washington but his successor continued the course with marked success and was able to report in 1907 that 95 per cent of the boys at the school were in that course. A Babcock tester

582

had been added to the laboratory equipment and was used by the students and for testing milk sent in by their parents and others. Through the good relations of the teacher with the students and their parents the school was "sharing with church and grange in providing a meeting place for town and country on a ground of common interest."

About this time the school board of Cecil County, Maryland, at the request of people in the northern part of that county, decided to establish a high school at Calvert and to give the course of study an agricultural trend. The board applied to the Maryland Agricultural College and the United States Department of Agriculture for aid in organizing the school. Mr. Sampson was furloughed to be its principal and teacher of agriculture. The school was opened November 5, 1906 in a rented two-room building, with about 9 acres of land adjacent to it. A four-years course was prepared with the cooperation of the county board and the Office of Experiment Stations. It included English, Latin, arithmetic, algebra, geometry, history and drawing, farm bookkeeping, and farm surveying, together with four years of agriculture combined with physical geography and the elements of physics, chemistry and botany. There were also laboratory and field exercises. The principal was very active in bringing the school to the attention of the community. The pupils participated in educational meetings, contributed articles to the county papers, took part in a farmers' institute and corn-judging contest, helped to renovate and spray an old orchard and made observation trips to farms. The principal visited the elementary schools within a radius of 5 miles from Calvert and interested the teachers and pupils in nature study and elementary agriculture. In the spring months he conducted a night school for the boys who had to leave the day school to assist in farm work.

The Farragut School at Concord, Tenn., was reorganized about 1907 to make it serve its community more fully. It had then a new brick building and 12 acres of land about $1\frac{1}{2}$ miles from a small village. This housed both elementary and high school departments, with a laboratory and home economics and manual training rooms. Six acres were used for demonstrations and for growing feed for live stock. Three courses, Latin, English, and agriculture, manual training and home economics, were offered. In the latter, besides the sciences and academic subjects common in high school courses, instruction was given in agriculture, manual training or home economics during the first two years and in the third and fourth years the student might continue the study of agriculture or take more physics and chemistry. Evening meetings for social and educational purposes held at the school brought it into closer touch with the people of the community.

The high school at Fairfield, Neb., in 1911 made visits to farms adjacent to the town a prominent feature of its agricultural instruction. The farmer visited, if he were in the live stock business, talked to the class on the history and merits of his favorite breed. Before going to the farm the students got all available information on this subject from textbooks and teachers. The practical talk and demonstration closed the instruction on this matter. A local expert judge of cattle was employed to accompany the class to the farm.

At Stockton, California, in 1910 a plan for a department of agriculture in the city high school which had 16 teachers and 450 pupils was made by school superintendent James A. Barr. This included two-and four-years courses in agriculture and home economics, with special reference to the agricultural and home problems of San Joaquin County, short courses for farmers in cooperation with the State College of Agriculture, preparation of teachers for the rural schools, publication and distribution of agricultural leaflets and the holding of institutes to consider agricultural and educational problems. The agricultural work would be in charge of

an expert director who would spend only one-third of his time in teaching and much of the remainder in extension work among the farmers. He would also have charge of nature-study, school gardening and elementary agriculture in the graded schools in Stockton. A portion of the 10-acre school site would be used for experiments designed to encourage better farm practices.

The high school at Coin, Iowa, offered four years of agriculture as an elective in 1910. Agriculture was taught by the school superintendent who had arranged the nature-study in the grades so as to make a good preparation for agriculture in the high school. The instruction covered soils, crops and silos in the first year; plant propagation, fruit growing, drainage, fertilizers and maintenance of soil fertility in the second year; animal husbandry and dairying in the third year; farm buildings, sanitation, water supply, ornamentation of home surroundings, farm mechanics and machinery, roads, bee-keeping, farm forestry, and the elements of farm accounting, marketing, and farm economics in the fourth year.

At Albion, Orleans County, N. Y., agriculture was taught in the high school in 1909 as an elective. The work was in charge of the teacher of science and included three forty-five minute periods and two ninety-minute periods each week for forty weeks. The course included soils, plants, animals, farm buildings and machinery, roads, and fruit growing. Forty-five exercises under these heads in the laboratory or elsewhere, with a written record of their results, were required of each student. Bailey's "Principles of Agriculture" was used as a text, supplemented by bulletins of the experiment stations, farmers' bulletins of the United States Department of Agriculture and manuals by a number of authors.

The consolidated school in Magnolia Township, Putnam County, Ill., had a high-school department, in which agriculture, manual training and home economics occupied a prominent place in 1908. This school was located out in the country, two miles from the small village of McNabb, and was housed in a \$12,000 brick building on a tract of 24 acres of timber pasture donated by Mr. John Swaney,

a farmer in moderate circumstances. An abandoned school house nearby was fitted up for a teachers' home. In the seventh and eight grades three twenty-minute periods a week were given to elementary agriculture and in the eighth grade there was also bench work. The high school course contained agriculture during the four years as an elective instead of Latin or home economics, together with physiology, zoology, (including entomology), botany, chemistry, physics and the academic subjects usually found in a standard course. In agriculture agronomy and horticulture were taught in the first year, swine husbandry in the second year, soil physics and feeding and judging live stock in the third year, and soil fertility as related to systems of farming in the fourth year. Besides the classroom instruction there were laboratory, shop and field exercises and observation trips to a nearby branch experiment station and to farms. The principal taught agriculture, manual training, science and some mathematics.

The Agricultural High School of Baltimore County at Sparks Station, Md., was opened in 1909, with B. H. Crocheron, a graduate of Cornell University, as principal and teacher of agriculture. This school was formed by the consolidation of four schools and was supported by county funds and local contributions. The pupils came by train, by private conveyance, or in school wagons. The first year there were 50 pupils in the high school and considerably more in the grades. The high school course included the usual academic subjects, except foreign languages, which were replaced by agriculture, home economics and manual training. The school had 7 acres of land and a new granite building, containing 5 class rooms, 3 laboratories and a farm-machinery room. During the summer the high school boys were required to conduct what are now called home projects, under direction of the principal. The school also tested seeds and milk for farmers.

The initial success of the school was very largely due to the interest aroused in the county by the preliminary activities of Mr. Crocheron. Before the opening of the school he moved about in the county getting acquainted with the

people, attending their agricultural meetings, teachers' institutes, etc. The men's agricultural club and the women's home interest club were made responsible for the public meeting when the school building was dedicated. After school opened a series of monthly meetings for rural teachers were held there, at which lessons in school methods, administration and agriculture were given. The principal also contributed lessons in elementary agriculture to a local publication, which was sent free by the school authorities to every teacher in the county.

For adult farmers a course of 10 weekly lectures was given, with an average attendance of 125 men and women. At the end of the series of lectures a two-days corn congress was held, with exhibits, demonstrations and addresses on corn growing and cooking. Twenty rural schools held preliminary corn shows and sent their best exhibits to the congress.

For the farmers' wives monthly meetings were held on Saturday afternoons, with the use of the school wagons. There was an average attendance of 85 women, divided into four groups which studied home economics, carpentry, home crafts or modern literature. A literary society was organized for young people not in school, with spelling bees, debates, etc.

In 1912 this school took part in a short course in wood-lot forestry under the direction of the Forest Service of the United States Department of Agriculture. (Office of Experiment Stations Report 1912, p. 325.) A class of 10 boys in the upper grades of the high school spent 10 days at a camp in the woods near Parkton, Md., on a tract of rough timberland. The mornings were devoted to study and recitations on the basis of a manuscript text furnished by the Forest Service. In the afternoons, there was field work consisting of identification of tree species, studies of their silvical qualities and habits, planning for cuttings, tree measurements, estimates of stands, etc.

The number of high schools in which some agriculture was taught increased very rapidly after about 1905. Instruction in agriculture or in its relations to botany, chemistry or zoology was given in about 400 high schools in 1910 and in about 2,000 schools in 1912 and their number had doubled by 1915.

This work was usually done by a single teacher in each school. Comparatively few of these teachers were well-trained in agriculture. Most of them had been employed primarily to teach science or some other subject. A number of textbooks on agricultural subjects, prepared with special reference to their use in secondary and elementary schools were available prior to 1915. There were also Federal and State bulletins giving outlines of courses in agriculture for secondary schools and instructions for teaching this subject. Textbooks and manuals prepared for college students, and informational bulletins of the United States Department of Agriculture and the State experiment stations were abundant. Short courses at the agricultural colleges were open to teachers, especially during the summer. Some high school teachers, especially those trained in the sciences, who were thoroughly interested in teaching agriculture and made the best of their opportunities for acquiring knowledge of this subject, taught it with great success. But in very many cases the instruction in agriculture in the ordinary high schools during this period was textbook work and often it was merely a small supplement to the instruction in one or two natural sciences.

Agriculture in Private Secondary Schools

Secondary schools on a private foundation early began to introduce the teaching of agriculture. Among these was the National Farm School at Doylestown, Pa., established in 1896, with special reference to the training of city boys. This school was so successful that in 1901 the State gave it an appropriation of \$2,500 annually for two years, which was afterwards increased. Its equipment included a farm of 122 acres, a main building, barn, greenhouses and live stock. The course covered four years. The science and practice of agriculture were taught, together with English, mathematics and natural science, and the boys did much of the labor on the farm.

308

The Union Academy at Belleville, N. Y. in 1901 received a gift of \$10,000 for the support of agricultural instruction and offered a four-years course.

The Agricultural and Technical Institute at Winona Lake, Ind., founded in 1902, introduced agriculture, with a graduate of Purdue University as teacher of that subject. In 1906 this institution was reorganized as an agricultural school, with a two-years course, given in three departments, (1) agriculture and chemistry, (2) dairying and animal husbandry, and (3) horticulture and forestry. The instruction was given through class-room recitations, laboratory and field work and field trips. The name of the institution was changed in 1909 to Winona College of Agriculture and it then offered "practical" and "special" two-years courses and advanced work in agriculture, the sciences and academic subjects,

The Mount Hermon School, near Northfield, Mass., founded by D. L. Moody, established in 1903 an agricultural department and put at its head Mr. Harry Haywood, assistant chief of the Dairy Division of the United States Department of Agriculture and a graduate of that school.

Smith's Agricultural School and Northampton School of Technology at Northampton, Mass., resulted from provisions in the will of Oliver Smith. (p. 184) His will provided for a number of charitable enterprises and was so administered by the board of trustees that by the opening of the 20th century the fund had grown from about \$370,000 to a total of more than a million dollars. The provisions of the will relating to an agricultural school did not make the fund for this purpose available before December 22, 1905, at which time it amounted to \$310,000.

This school has two large brick buildings, farm house, barn and a farm of 93 acres, but no dormitories. It is open to boys and girls. For admission preference is given to those students who have completed elementary courses but others may be admitted on trial. The academic subjects taught are "English, general mathematics, general history of industry, United States history, citizenship, economics of production, exchange and distribution, first aid, personal hygiene

and social problems." "Approximately half of each pupil's time is spent in shops, laboratories, workrooms and outside productive work; the other half is spent in class room study." Agricultural subjects are taught by the director, the head of the agricultural department and the farm superintendent. The agricultural course occupies four years of 32 weeks. The school opened with departments of agriculture, household arts and trades. The latter has since been divided into departments of carpentry, sheet metal, silk textiles and automobiles.

The Illinois College at Jacksonville, Ill., inaugurated secondary work in agriculture in 1908 as the result of a bequest of \$20,000 for this purpose by Mrs. Phoebe G. Strawn. Courses were offered in soil fertility and fertilizers, soil physics, agricultural botany, and agricultural zoology. This work was supplemented by occasional lectures by agricultural experts. The first lecture was given by Dean Davenport of the University of Illinois.

(p. 182)

The Genesee Wesleyan Seminary at Lima, N. Y.,^A opened in 1832, established a department of agriculture in 1909 with a graduate of Cornell University as teacher. This school has a farm of 80 acres, equipped with dairy cows, poultry and other facilities for gardening, fruit growing and general agriculture.

In Vermont in 1910 a secondary school of agriculture was opened at Lyndonville. This resulted from donations by Theodore N. Vail, president of the American Telegraph and Telephone Company, who provided a small farm with its buildings and funds for the agricultural instruction. He also permitted the students of this school to utilize his large estate on the hills near Lyndonville for observations and judging of his dairy herd, studies in farm forestry, etc. In organizing the school Mr. Vail had the advice of President W. D. Gibbs of the New Hampshire Agricultural College, Dean J. L. Hills of the College of Agriculture of the University of Vermont, the State Superintendent of Education, the president of Middlebury College and others. A two-year course in scientific and practical agriculture ^{was} offered, with special reference to Vermont conditions. This course

extended over nine months in each year and was open to residents of the State eligible for admission to an approved high school. Students might pay their expenses in cash or by working on the school farm throughout the year. In the latter case they were allowed \$25, with board and lodging, during vacation and 15 cents an hour for work during the school year. Arthur W. Merrill, a graduate of the New Hampshire College and for several years a teacher of agriculture at the Baron de Hirsch School in New Jersey, was made director of the Lyndonville School.

From 1908 when the Office of Experiment Stations reported that there were 16 private colleges and schools teaching agriculture the introduction of this subject into private schools proceeded rapidly. In 1915-16 the Bureau of Education reported 12 private agricultural secondary schools and 149 private secondary schools in 37 States, in which some instruction in agriculture was given. The latter included 5 in Alabama, 3 in California, 1 in Colorado, 1 in Connecticut, 3 in Georgia, 3 in Idaho, 4 in Illinois, 4 in Indiana, 14 in Iowa, 4 in Kansas, 9 in Kentucky, 5 in Maine, 3 in Maryland, 3 in Massachusetts, 2 in Michigan, 2 in Minnesota, 6 in Mississippi, 5 in Missouri, 5 in Nebraska, 5 in New Hampshire, 2 in New York, 8 in North Carolina, 2 in North Dakota, 3 in Ohio, 2 in Oklahoma, 1 in Georgia, 6 in Pennsylvania, 2 in South Carolina, 1 in South Dakota, 9 in Tennessee, 8 in Texas, 6 in Utah, 2 in Vermont, 6 in Virginia, 1 in Washington, 1 in West Virginia and 1 in Wyoming.

General Status of Secondary Education in Agriculture in 1916

During twenty-five years beginning about 1890 there was a new and rapidly growing movement for the establishment of schools and courses in agriculture of secondary grade in a great variety of institutions. When the United States Bureau of Education made a survey of the status of this movement for the school year 1915-16 it found that secondary instruction in agriculture was given in the following classes of institutions:

Number of institutions

1. Secondary schools of agriculture at State agricultural colleges	28
2. Public normal schools*	124
3. Special agricultural schools receiving State aid	74
4. Vocational agricultural departments in public high schools under State supervision	421
5. Public high schools not State aided	2760
6. Private agricultural secondary schools	12
7. Private secondary schools (not special)	149
8. Secondary and higher schools for negroes	<u>107</u>
Total	3675

* Not including 27 county teacher-training schools in Wisconsin.

The number of institutions given in this table is only approximate. It includes the schools which reported that they had students actually studying agriculture during the school year 1915-16. Others reporting courses offered but no students are not included, as well as still others reporting that they were teaching agriculture indirectly through "agricultural botany", "agricultural zoology", "agricultural biology," etc. The statistics for number of students pursuing agricultural courses were incomplete. At the secondary schools in the agricultural colleges there were 3,958 students, in the State-aided special schools 6,643, in the public high schools 60,925, and in the private schools (not special) 2,004. It thus appears that more than 73,000 students in secondary schools in the United States received more or less instruction in agriculture during that year. The movement had, however, far outrun the ability of the colleges and normal schools to supply an adequate number of teachers trained in agriculture. Therefore in very many of the schools which were attempting to teach agriculture the instruction was given by teachers of science or other academic subjects and many of these teachers had had no actual experience in practical agriculture. Under such conditions the inevitable result was that agricultural instruction in very many

schools became merely cultural or informational and involved mainly textbook work. On the other hand in a limited number of schools the agricultural instruction became more vocational, better trained teachers were employed, and laboratory and practice work at the schools or on home farms was required.

During this period manual training and home economics had been introduced into many of the schools where agriculture was taught and also into many other secondary schools throughout the United States. But the instruction in these subjects had also not had the distinct vocational results which had been anticipated. Hence arose a demand for a more definite type of industrial education for students coming out of the elementary schools. Propaganda to secure State and Federal aid for vocational education increased in intensity and extent. The movement for secondary agricultural education became involved in the broader movement for education relating to all the industries. An account of this movement and its results, particularly as related to agricultural education, will be given in the next chapter.

Secondary Instruction in Agriculture with Federal Aid 1917-1925

The Smith-Hughes Vocational Education Act was approved by President Wilson February 23, 1917. It is permanent legislation and carries annually large amounts of Federal funds for instruction in agriculture, home economics and trades and industries to persons over 13 years of age. This act and the Smith-Lever Agricultural Extension Act passed in 1914 were the outcome of an active movement for vocational education below college grade carried on for more than a decade by agricultural and industrial forces, especially as represented by the Association of American Agricultural Colleges and Experiment Stations and the National Society for Industrial Education. The activities of the forces seeking Federal aid for vocational education were more or less interrelated. Therefore, to understand the full significance of the movement it is necessary to consider its industrial, as well as its agricultural features.

Rise of the movement for industrial education

During the nineteenth century there were in a few places in the United States efforts to provide distinctly vocational training of elementary or secondary grade. Such, for example, were the Girard College in Philadelphia (1848), the Mechanics Institutes in New York City (1820), Cincinnati (1828), Richmond, Va. (1854), and Rochester, N. Y. (1856); the Miller School in Albemarle County, Va. (1878), the Institutes for negroes at Hampton, Va. (1868), and Tuskegee, Ala. (1880); the evening classes of the Franklin Institute in Philadelphia (1824), the Cooper Union in New York City (1859), the Industrial School in Boston (1848), and the Trade School in Lowell, Mass. (1872).

Manual training in city high schools after 1880 had some vocational features but was mainly of general educational value. Meanwhile the apprenticeship system as a preparation for industrial work was passing away. Increasing numbers of boys and girls were leaving the high schools without preparation for any industry. Many of these youths were drifting into the "blind alley" occupations or into criminality. The great corporations which employed many workers in mechanic arts were seeking substitutes for the apprenticeship system. From 1904 the National Association of Manufacturers had a committee on industrial education which repeatedly urged the establishment of trade schools. The National Metal Trades Association discussed this subject in 1910 and contributed \$1,000 to the National Society for the Promotion of Industrial Education. A convention of persons interested in trade schools was held at Indianapolis in 1907. The labor unions, which at first had opposed industrial schools for fear they would turn out too many trained workers for different trades, were beginning to realize the importance and desirability of a carefully guarded public system of vocational education of secondary grade. In 1907 the American Federation of Labor adopted a resolution favoring industrial and technical education and the following year created a committee which reported in favor of such education under public control and with Federal aid. Educators, publicists

and industrial leaders were awakening to the importance of training American youth for industrial pursuits and were watching with increasing interest the efforts of European countries, especially Germany, to maintain an adequate supply of skilled workers in industries with the aid of vocational schools. The National Education Association began the discussion of industrial education in 1900 which was continued at succeeding meetings, especially through the work and reports of committees. In 1908 this association approved trade schools, industrial schools and evening continuation schools and in 1912 created a committee of educators, employers, and social workers to study the needs of adolescents for vocational guidance and education.

The Massachusetts Commission on Industrial and Technical Education

The Massachusetts legislature by an act of May 24, 1905, provided for a Commission on Industrial and Technical Education, consisting of nine persons "representing the manufacturing, agricultural, educational and labor interests" to "investigate the needs for education in the different grades of skill and responsibility in the various industries in the Commonwealth. They shall investigate how far the needs are met by existing institutions and shall consider what new forms of educational effort may be advisable," taking into account "similar educational work done by other States, by the United States Government, and by foreign governments." (251) ^ This commission of eight men and one woman, with Carroll D. Wright, as chairman, made its report in April, 1906. They had studied the problems of industrial education as related to both the children and the industries. They found a general and theoretical interest among educators and students of social phenomena and "a practical and specific interest among manufacturers and wage earners because of a personal need." They were "made aware of a growing feeling of inadequacy of the existing public school system to meet fully the need of modern industrial and social conditions." They were "not able to learn that even the people who are most interested in industrial education have any definite ideas as to its proper scope and method," but there was a general impression that the expense of industrial education should be borne at least in part by the State. As

the result of public hearings and special investigations the commission concluded that (1) "for the great majority of children who leave school to enter employments at the age of 14 or 15, the first three or four years are practically waste years so far as the actual productive value of the child is concerned, and so far as increasing his industrial or productive efficiency" (in Massachusetts at that time fully 25,000 children were going to work or were idle at 14 and 15 years of age); (2) children continuing in school until 16 or 18, "especially if they complete a high school course are able to enter upon employment of a high grade, usually in mercantile pursuits * * * but they are wholly lacking in manual skill and in what we have called industrial intelligence;" (3) "The productive industries of the State, including agriculture, manufactures and building, depend mainly upon chance for recruiting their service;" (4) "This condition tends to increase the cost of production, to limit the output in quantity and to lower the grade in quality;" (5) "The industries of Massachusetts need * * * a broader training in the principles of the trades and a finer culture in taste as applied to material, workmanship and design;" (6) "The State needs a wider diffusion of industrial intelligence as a foundation for the highest technical success and this can only be acquired in connection with the general system of education into which it should enter as an integral part from the beginning;" (7) Since women are entering the industrial world by necessity they should be trained in industries, especially those most closely allied to the home and "housekeepers need to be instructed in the laws of sanitation, in the purchase, preparation and care of food, and in the care of children that the home may be a home, and not merely a house."

The Commission recommended

that cities and towns so modify the work in the elementary schools as to include for boys and girls instruction and practice in the elements of productive industry, including agriculture and the mechanic and domestic arts, and that this instruction be of such a character as to secure from it the highest cultural as well as the highest industrial value; and that the work in the high schools be modified so that the instruction in mathematics, the sciences and drawing shall show the application and use of these subjects in industrial life, with especial reference to local industries, so that the students may see that these subjects are not designed

primarily and solely for academic purposes, but that they may be utilized for the purposes of practical life. That is, algebra and geometry should be so taught in the public schools as to show their relations to construction; botany to horticulture and agriculture; chemistry to agriculture, manufactures and domestic sciences; and drawing to every form of industry.

The Commission would also recommend that all towns and cities provide by new elective industrial courses in high schools instruction in the principles of agriculture and the domestic and mechanic arts; that in addition to day courses cities and towns provide evening courses for persons already employed in trades; and that provision be made for the instruction in part-time day classes of children between the ages of fourteen and eighteen years who may be employed during the remainder of the day, to the end that instruction in the principles and the practice of the arts may go on together. (251)

The commission also submitted a bill "to provide further for industrial education." This involved the appointment of a Commission on Industrial Education of 5 persons for 5 years, with a paid secretary as executive officer, "to initiate and superintend the establishment and maintenance of industrial schools for boys and girls in various centers of the State, with the cooperation and consent of municipalities or union districts.

All towns and cities may provide independent industrial schools for instruction in the principles of agriculture and the domestic and mechanic arts, but attendance upon such schools of children under fourteen years of age shall not take the place of the attendance upon public schools as required by law. (251)

Evening and part-time classes may also be provided for persons in industries. These schools and classes must be approved by the commission. To aid in the establishment of such schools and classes the State would pay annually from $1/5$ to $1/2$ of their cost "proportionate to the amount raised by local taxation" and expended for these purposes. The trustees of the Massachusetts Agricultural College were also authorized to establish a normal department for training teachers of the elements of agriculture.

An act similar to this bill was passed in 1906 but in 1909 the Commission on Industrial Education was consolidated with the reorganized State Board of Education under which was a commissioner of education and two deputy commissioners, "one of whom shall be especially qualified to deal with industrial education."

The National Society for the Promotion of Industrial Education

The first report of the Massachusetts Commission on Industrial Educa-

tion created widespread interest in this subject. Soon after its publication Dr. James P. Haney, director of manual training in the public schools of New York City, and Charles R. Richards, director of the department of manual training in Teachers College of Columbia University, "came to the conclusion that the time had come to secure united action concerning industrial education." They brought together eleven other men in New York June 9, 1906, and this company appointed a committee on organization. As a result of their efforts about 250 persons met at Cooper Union November 16, 1906 and formed the National Society for the Promotion of Industrial Education. (83) New York, Chicago, Boston, Philadelphia, Milwaukee, Cincinnati, Raleigh and other cities were represented at this meeting. Dr. Henry S. Pritchett, then president of the Massachusetts Institute of Technology, was elected president of the society and Professor Richards was made secretary. Among the members of its first board of managers were Doctor Haney, Frank A. Vanderlip, Jane Addams, James P. Munroe, S. B. Donnelly (secretary of the general arbitration board of the New York building trades), Mrs. M.M. Kehew (a member of the Massachusetts Commission on Industrial Education), and Frederick P. Fish (president of the American Telephone and Telegraph Co.). Educators, manufacturers, mechanics, business men and persons of other occupations were members of the society. The constitution stated that "the objects of this society shall be to bring to public attention the importance of industrial education as a factor in the industrial development of the United States; to provide opportunities for the study and discussion of the various phases of the problem; to make available the results of experience in the field of industrial education both in this country and abroad, and to promote the establishment of institutions for industrial training."

The society immediately began to issue bulletins containing information regarding its organization and work, and matters relating to the progress of industrial education. Among its early publications are Bul. 2, Selected bibliography on industrial education; Bul. 4, Industrial training for women; Bul. 8, Education of workers in the shoe industry; Bul. 11, A descriptive list of Trade and Industrial Schools in the United States; and Bul. 12, Legislation upon industrial education in the United States.

The society soon gained the favorable attention of President Roosevelt who sent to Dr. Pritchett on May 24, 1907, an extract from an address he was about to make at the 50th anniversary of the founding of the Michigan Agricultural College. In this address the President said - "For at least a generation we have been waking to the knowledge that there must be additional education beyond that provided in the public school as it is managed today. Our school system has hitherto been well nigh wholly lacking on the side of industrial training, of the training that fits a man for the shop and the farm. This is a most serious lack, for no one can look at the peoples of mankind as they stand at present without realizing that industrial training is one of the most potent factors in National development. We of the United States must develop a system under which each individual citizen shall be trained so as to be effective individually as an economic unit, and fit to be organized with his fellows so that he and they can work in efficient fashion together. This question is vital to our future progress and public attention should be focused upon it. Surely it is eminently in accord with the principles of our democratic life that we should furnish the highest average industrial training for the ordinary skilled workman. * * * Surely this means that there must be some systematic method provided for training young men in the trades, and that this must be coordinated with our public school system." (272)

The first annual meeting of the society was held at Chicago in January, 1908, at which time Henry Wallace of Iowa, editor of Wallace's Farmer, spoke on the training of farm boys. But the society made its first real contact with the movement for secondary education in agriculture when it held its second annual meeting at Atlanta, Ga., in November, 1908. There Hoke Smith, then Governor of Georgia, called attention to the eleven district agricultural schools being established in that State, and Charles R. Davis, Member of Congress from Minnesota, spoke on his bill for Federal aid to agricultural and industrial education in secondary schools. This bill had been introduced first in the second session of the 59th Congress and in modified form in the first session of the Sixtieth Congress (1907). It practically was intended to extend Federal aid to agricultural high schools of the Minnesota type, with branch experiment stations, and to normal schools giving instruction in agriculture, home economics and mechanic arts.

Prof. W. M. Hays, who had been active in the movement for agricultural schools in Minnesota and had been in close touch with Mr. Davis in the formulation of his bill for Federal aid to secondary schools, attended the meeting of the society at Milwaukee in December, 1909, in his capacity as Assistant Secretary of Agriculture, and spoke on vocational education and legislation. While he did not mention the Davis bill, it was undoubtedly understood that he was an active advocate of that measure.

The society at this time was giving much attention to the promotion of State legislation for industrial education. It cooperated in 1910 with the American Association for Labor Legislation in the preparation of a bulletin giving a summary of legislation in the United States relative to industrial education in public elementary and secondary schools, prepared by Edward C. Elliott, professor of education in the University of Wisconsin, and a critical and comparative comment on this legislation, by C. A. Prosser, deputy commissioner of education in Massachusetts.

This showed that 29 States had legislated for practical education in agriculture, home economics, trades and industries, or manual training, in secondary schools supported and controlled by the public, wherein tuition is free and open to all able to meet their entrance requirements. Of these States 19 had provided for technical high schools, 18 for manual training, 11 for home economics, 19 for agriculture, 11 for trades and industries, and 3 for all the practical activities. Sixteen States had accompanied such legislation with financial aid, as follows: 9 for manual training, 1 for technical high schools, 11 for home economics, 13 for agriculture, 8 for trades and industries, and 2 for all the practical activities. Of the 16 States granting aid for practical activities of some kind 14 had so provided since 1903.

It seems also fair to say that vocational training for agriculture and for the industries seems to have thus far reached its most satisfactory development in those commonwealths in which it has received substantial State aid. The further development of public vocational education would seem to be dependent in large measure upon legislation providing for state initiative, state subsidy, and a reasonable degree of state control.

Current discussion and legislation regarding vocational education showed such a confusion of terminology that Mr. Prosser, with the aid of Dr. David Snedden, undertook in this bulletin to give definitions of some of the terms commonly used in describing its various forms. Vocational education was defined as that whose controlling purpose is to fit for a calling or vocation. It may be divided into five forms, professional, commercial, industrial, agricultural and household. Vocational education involves formation of habits, development of intelligence and cultivation of ideals. In its completeness it involves practice in the productive work of the calling itself and study of or about the sciences, art, mathematics, economy, history or technique which enter into or relate to it. Industrial education, as distinguished from other forms of vocational education, is that whose controlling purpose is to fit for a trade, craft or special division of manufacturing work. Technical education may be vocational or not, depending

on its effect on the learner and its relations to productive efficiency. Manual training may contribute to technical training but as ordinarily taught is only slightly or remotely vocational or is so for occasional individuals. The trade school is an industrial ^{institution} in which practical work at least as exercises, if not productive, is a prominent feature.

The Society for Industrial Education was at this time in close touch with the American Federation of Labor and John Mitchell, then second vice-president of the federation, was on the board of managers of the society. At its meeting in Boston in 1910 Charles H. Winslow, as a representative of the federation, in a paper on "Labor's demands on industrial education," maintained that "all industrial education should be a public function and provided for by public funds" and that "emphasis must be placed on education rather than on product," for "we must not develop a one-sided education with the single aim of turning out a mechanic at the possible sacrifice of the citizen of tomorrow."

Meanwhile the Association of Agricultural Colleges had moved in support of Federal aid for agricultural extension work under direction of these colleges. In 1909 its committee on extension work outlined a plan for a Federal appropriation for this purpose and on December 15, 1909 a bill embodying this plan was introduced in the House of Representatives by Mr. McLaughlin of Michigan. Early in 1910 Senator Dolliver of Iowa introduced two bills, one for extension work and the other for vocational education in secondary schools. These were combined by the Senate Committee on Agriculture and Forestry, of which Mr. Dolliver was chairman, and on June 2, 1910 he reported a bill (S. 8809 U. S. 61st Congress, 2d session) "to cooperate with the States in encouraging instruction in agriculture, the trades and industries, and home economics in secondary schools; in maintaining extension departments in State colleges, and in preparing teachers for these vocational subjects in State normal schools and to appropriate money and regulate its expenditure."

Senator Dolliver died October 15, 1910 and Senator Carroll S. Page of Vermont, on March 3, 1911, introduced a similar bill. This was amended at different times by Senator Page and as Senate Bill 3 was debated in 1912 and 1913. (See p. 859)

The Society for Industrial Education at its annual meeting at Cincinnati, Ohio, November 2-4, 1911, received a report from its committee on National legislation, by Dr. Sheldon, which dealt at some length with the Page bill. This report states the Society "hitherto has not given very serious consideration to this measure" but the committee thinks that the objects contemplated by the Page bill are on the whole worthy of the encouragement of the society, though in details the bill needs amendment. A substitute bill was therefore presented for the consideration of the society. This was a simpler measure leaving out appropriations for extension work and branch experiment stations and specific reference to normal schools in the provisions for training teachers and providing for a single administrative agency in Washington and in each State and a system of reimbursement in the expenditure of the Federal funds, which were to be allotted to the States on the single basis of population. Details of the organization of the schools for vocational education were to be left to the local school authorities. The society was by this time willing to take a more active part in support of Federal appropriations for secondary vocational education. In the published proceedings of the Cincinnati meeting the Secretary comments on the broader and more constructive aims of the society and includes among them "to aid in bringing about national legislation in favor of industrial education, of such a character as to insure wise and efficient administration of funds for the purpose intended." The society had grown to be a strong organization with over 1,300 members, many of whom had great influence in the industrial world; it had financial assistance outside of the dues paid by its members, and maintained a salaried secretary who spread its influence widely by correspondence, addresses before various organizations, the distribution of publications, etc.

At the meeting of the society at Philadelphia, December 5-7, 1912, Senator Page made a statement regarding the history of his bill and gave special credit to Dr. Snedden and Dr. Prosser for their assistance in perfecting the bill. Speaking on this subject from the standpoint of the manufacturer, Mr. James P. Munroe of Boston strongly favored the Page-Wilson bill and offered resolutions asking the Senate "to give immediate and favorable consideration" to this bill. These resolutions were passed unanimously by a rising vote.

On April 1, 1912 Mr. Prosser became secretary of the society and began a very active propaganda in its interests, including especially the advocacy of Federal aid for vocational education. This is shown in his first report in Bulletin 16 of the society, as follows:

During the year which followed, he has in the discharge of his duties traveled more than 50,000 miles, made addresses in fifteen States, dealt with problems connected with vocational education in a dozen commonwealths, and in not less than fifty of the leading centers of population of the country made more than one hundred addresses before all kinds of national, state, and local gatherings, representing labor, manufacturing, commercial, social, and educational interests, and set up points of helpful cooperation with every national organization interested in the promotion of the practical and civic education of our great army of wage workers.

The campaign for federal aid for vocational education in the last Congress was led by the Society. While not agreeing with a number of its details, hearty support was given to the general spirit and purpose of the Page-Wilson bill, introduced by Senator Carroll S. Page of Vermont in the Senate and Representative William B. Wilson of Pennsylvania, now Secretary of Labor, in the House. The bill proposed to give money from the national treasury to stimulate and encourage the states to begin the task of preparing teachers, and of establishing all-day, part-time, continuation, and evening schools, training the great mass of our workers for the duties of the shop, the home, and the farm.

Thru an unfortunate controversy between this measure and another known as the Lever-Smith bill, introduced by Congressman Lever in the House, and Senator Hoke Smith in the Senate, both bills died in a Joint Conference Committee between the two Houses. The friends of the Page bill sought in every way to arrange a compromise between the two bills, so that in addition to the Lever bill, providing instruction in agriculture for mature farmers only, something should be secured for the benefit of the training of those who are engaged in wage-earning occupations of all kinds from towns and cities.

* * *

There is every indication that a bill providing national grants for practical education will be passed at this coming season of Congress. Largely under the leadership of our Society, a tremendous public sentiment has been aroused in this country and focused upon the need for vocational education and upon the necessity that the National Government should, out of its large resources, and as one great economic unit competing with other nations, begin the task of training its own workers as Germany did thirty years ago. Every consideration, economic, industrial, commercial, social, civic, and educational, is hastening this important step.

All the friends of vocational education, however, should feel encouraged rather than discouraged over the outcome of the fight at Washington for National grants. The battle is really won.

* * *

Our Executive Committee is now engaged in the preparation of a measure which will embody the principles and policies adopted at the Cincinnati Convention (1911), and which it is believed will receive the earnest support of our members and of all the other organizations which have already responded so heartily to our previous appeals in behalf of this great cause." (83)

On June 5, 1912, Senator Page made a long speech in the Senate explaining in detail many of the 36 sections which his bill as amended up to that time contained.

When it appeared that Congress would not pass the Page bill the National Society for Industrial Education undertook to secure the appointment of a Commission on National Aid for Vocational Education. On April 7, 1913 Senator Hoke Smith introduced a joint resolution creating such a commission. After this resolution had passed the Senate and was pending in the House the Society voted to push its enactment and "to aid this Commission in recommending and securing legislation providing national grants for the work which shall be based on sound principles of government and of administration." This resolution passed both houses and was approved by President Wilson January 20, 1914. It provided for a commission of nine persons to be appointed by the President. The appointments made included the Secretary and four other members of the society. In this way the society was very influential in determining the character and form of the Federal legislation to aid vocational education. The commission framed a bill which included Federal aid to secondary education in agriculture, home economics (p. 862) and trades and industries. The society at its meeting in Richmond, Va., in December 1914, resolved that as an organization, and through the action of its individual members, it "should press forward as rapidly as possible, having due regard to the soundness and permanency of the several steps, toward the securing of Federal aid, under wise restrictions, for the promotion of industrial, well as agricultural and household arts education in the several States."

Two years were required before this object was accomplished through the passage of the Smith-Hughes Vocational Education Act. The influence of the society was then further shown by the appointment of James P. Munroe as the member of the Federal Board for Vocational Education to represent trades and industries and of Mr. Prosser as director of the administrative organization created by the board. Since that time the society has been active in promoting the general interests of vocational education, especially in its industrial phases, through its annual meetings and publications. The broader aspects of its work were indicated in 1918 by the change of its name to Society for Vocational Education.

Bills in Congress for Federal aid to vocational education prior to 1914

In Congress the movement which resulted in the Smith-Hughes Vocational Education Act may be said to have begun on February 21, 1906 when Ernest M. Pollard of Nebraska introduced in the House of Representatives a bill to grant Federal aid to normal schools. A similar bill was introduced in the Senate the next day by Elmer J. Burkett of Nebraska. This bill had been drafted by the president of the State Normal School, the State Superintendent of Public Instruction and the attorney-general of Nebraska because that State had no institution for training teachers of agriculture though a law passed in 1901 required examinations in this subject for certain grades of teachers' certificates. Under this bill Federal funds were to be given to the States for training teachers of agriculture, manual training, domestic science and related subjects. The initial appropriation was to be \$500,000 and this was to be increased annually by \$100,000 until it reached a maximum of \$1,000,000. One half of the appropriation was to be equally divided among the States and the other half was to be allotted to the normal schools in proportion to the length of their term and the number of their students. The Secretary of the Interior was to administer the act. This bill was before the 59th, 60th and 61st Congresses. It had considerable support throughout the country, including the indorsement of the Department of Superintendence of the National Education Association.

A somewhat similar bill was introduced in the 60th Congress by Senator McCreary of Kentucky. The Burkett-Pollard bill is supposed to have had some influence on the insertion in the Nelson Amendment to the Agricultural Appropriation Act of 1907 of the proviso that the Federal funds granted to the land-grant colleges under that act might be spent for the training of teachers of "the elements of agriculture and the mechanic arts."

At the time that Georgia was greatly interested in the establishment of agricultural schools, Leonidas Livingston of that State at the suggestion of Governor Terrell on December 18, 1906 introduced in the House of Representatives a bill to grant annually \$10,000 of Federal funds to such schools in each Congressional district throughout the United States. The same bill was introduced in the Senate by Alexander Clay of Georgia, January 21, 1907. This was followed a few weeks later by a bill introduced by Representative William Adamson of Georgia to appropriate \$2,500 annually to each branch agricultural experiment station established in congressional districts, in any State or Territory.

On January 22, 1907, Representative Charles R. Davis of Minnesota, a member of the Committee on Agriculture, introduced his first bill for Federal aid for vocational education. This proposed to give annually 10 cents per capita of population for the teaching of agriculture and home economics in secondary agricultural schools in districts of not less than 10 counties, and for the teaching of mechanic arts and home economics in urban schools, and \$2,500 to each branch experiment station connected with an agricultural school. The Secretary of Agriculture was to administer the act.

In the 60th Congress Mr. Davis, though no longer on the Committee on Agriculture, actively supported his bill. The friends of the normal schools secured the favorable influence of President Roosevelt and as a result the Davis bill was amended to include an appropriation of 1 cent per capita of population for the teaching of agriculture, home economics and mechanic arts in public normal schools. The bill

gained a large and increasing measure of support. It was indorsed by the National Grange, the Farmers' National Congress, the National League for Industrial Education, and the Southern Education Association. Prof. W. M. Hays was closely associated with Mr. Davis in framing and supporting this bill. It was, however, strongly opposed by educators and others who feared that it would create a system of vocational education apart from the general public school system. This opposition was voiced, for example, by Dr. Elmer E. Brown, then Commissioner of Education, and Dean Eugene Davenport of the Illinois College of Agriculture. In an effort to allay opposition the bill was amended so as to give the administration of the act to the Secretary of the Interior, in cooperation with the Secretaries of Agriculture, and Commerce and Labor. But this was not very satisfactory.

The American Federation of Labor now began to take more active interest in this matter and through its Committee on Industrial Education somewhat revised the Davis bill and gave it to Senator Dolliver of Iowa, who introduced it in the Senate on January 5, 1910. Soon afterward Mr. Davis introduced it in the House.

In the Dolliver-Davis bill lump sums to be distributed to the States were appropriated.

With this bill Senator Dolliver also introduced the agricultural extension bill which Mr. McLaughlin had introduced in the House. Both bills went to the Senate Committee on Agriculture and Forestry of which Mr. Dolliver was chairman. That committee decided to combine these bills and on June 22, 1910 reported the combined bill favorably. In this new bill the administration was given to the Secretary of the Interior. It was now hoped that all the forces which had been interested in the previous bills would unite in support of this combined bill. But this did not occur and new forms of opposition arose. The Association of ~~Land-grant~~ ^{Agricultural} colleges decided to give its active support to the McLaughlin Extension bill. The National Society for Industrial Education (Bulletin 15) declined to indorse the Dolliver bill but instead gave out the following statement:

508

We highly commend the general spirit and purpose of Senate Bill No. 8809 (Dolliver Bill). We have, however, grave doubts as to whether the bill as at present drawn will accomplish the purposes in view. It should be modified by the introduction of specific terms to the end that it shall clearly provide:

1. For cooperation on the part of the Federal Government with the several States of the Union in encouraging vocational education in the trades and industries, agriculture and home economics; in founding agricultural experiment stations; and in providing means for the training of special teachers for industrial, agricultural and home economics education;

2. For a definite limit to the amount of money appropriated under this act by the United States Government for each of the above-named purposes; and for an equitable means of distributing the sum appropriated among the several States in proportion to their approximate probable needs;

3. For the gradual availability of the sums appropriated to the end that the maximum limit may be reached only after a period of from six to ten years;

4. For the contribution from each State of a sum equal to that contributed to said States by the Federal government;

5. For a restriction limiting the use of the Federal contribution and the equal State contribution to the defraying of the expenses of instruction in these branches of study which the bill is intended to encourage, to the end that no part of said sum shall be used for general purposes;

6. For a provision permitting each State to propose the type and location of the schools in which vocational training is to be established, on condition that such proposal be approved by a properly constituted Federal authority;

7. For a requirement that each State shall propose its own methods of supervising any educational agencies established under the provisions of this bill, provided said methods of supervision shall be duly approved by a properly constituted Federal authority;

8. For, a careful definition of the terms relating to forms of education and experimentation, to the end that ambiguities and misunderstandings may be avoided;

9. For adequate Federal supervision that shall ensure satisfactory results from the schools established. (83)

The friends of the Dolliver bill therefore decided not to press that measure in the 61st Congress but to prepare for an active campaign in the 62d Congress. Senator Dolliver died in October 1910. Senator Carroll S. Page of Vermont succeeded him in the Senate Committee on Agriculture and Forestry and on the closing day of the 61st Congress introduced a somewhat modified form of the Dolliver bill.

The Page Bill

The original bill by Senator Page was introduced March 3, 1911 (S. 10905, 61st Congress, 3d session) and was referred to the Committee on Agriculture and Forestry, of which he was a member. It proposed appropriations (1) of \$5,000,000 annually for instruction in the trades and industries, home economics and agriculture in public schools of secondary grade in the States, Territories and District of Columbia, (2) \$4,000,000 annually for instruction in agriculture and home economics in State, district agricultural schools of secondary grade, (3) \$1,000,000 annually for branch agricultural experiment stations at the agricultural high schools, (4) \$500,000 annually, with additional amounts increasing by \$200,000 for 5 years, for extension departments of agriculture, trades and industries, home economics and rural affairs, at the land-grant colleges, or State departments of agriculture, provided the States appropriated sums equal to the additional amounts; (5) \$1,000,000 annually for instruction in agriculture, trades and industries, and home economics at State and Territorial normal schools. In States where separate schools and colleges are maintained for negroes there must be a division of the funds for instruction in proportion to the population of the two races. The districts for State and agricultural schools and branch experiment stations must include from 5 to 15 counties. Short, continuation and evening courses must be provided for persons not able to take the regular courses. The Secretary of the Interior, with the assistance of the Secretaries of Agriculture and of Commerce and Labor, was charged with the administration of this law.

In a different form this bill was again introduced in the Senate April 6, 1911, (Senate 3), and in the House by William B. Wilson of Pennsylvania, who had been for eight years secretary of the United Mine Workers of America. In the Senate it was reported with amendments by the Committee on Agriculture and Forestry February 26, 1912. Senator Page made his principal speech on his bill in the Senate June 5, 1912. It had by this time grown from 12 to 36 sections. An appropria-

tion of \$480,000 annually to the State colleges of agriculture and mechanic arts for the preparation of teachers had been added. The Secretary of Agriculture alone was to administer the funds granted for extension departments and branch experiment stations. The States must provide a board for vocational education, which may be the board for education in general, to control the funds given for vocational instruction and teacher-training. The total annual Federal appropriations were to increase from \$2,077,000 in 1913 to \$14,752,000 in 1921, when they would be divided as follows:

For the teaching of agriculture, the trades and industries and home economics, in connection with our general secondary or public high-school system	\$3,000,000
For the teaching of the trades and industries and home economics in separate schools	3,000,000
For instruction in agriculture and home economics in State district agricultural schools	3,125,000
For agricultural extension work	2,980,000
For branch experiment and demonstration stations at district agricultural schools	1,050,000
For the education of teachers at State normal and other training schools	1,027,000
For the education of teachers at State agricultural colleges	480,000
For administrative expenses	<u>90,000</u>
Total	\$14,752,000

Senator Page stated that in connection with a meeting of the Southern Commercial Congress in Washington in December 1911, a large number of educators from all parts of the country, including the executive committee of the Association of Agricultural Colleges, had held a conference on this bill and that it had been revised by a subcommittee and then indorsed by the conference. The subcommittee was as follows:

Hon. Coe I. Crawford, United States Senator, chairman; Dr. P. P. Claxton, United States Commissioner of Education; Dr. W. O. Thompson, president Ohio State University; Dean H. L. Russell, of the University of Wisconsin; Hon. Willet M. Hays, Assistant Secretary of Agriculture; Mr. G. G. Dawe, Managing director of the Southern Commercial Congress; and Dr. J. H. Connell, president of the Oklahoma State Agricultural and Mechanical College.

The question of the unpreparedness of the country to take up this work was one of the leading topics of discussion at this meeting, and the conclusion reached was that we must add another half million dollars to the appropriation for the education of teachers by agricultural and mechanical colleges and that we should put off the time when the main features of the appropriation should become available till the year ending June 30, 1916.

* * *

We make provision that each locality shall draw according to the amount it contributes. There is, however, an alternative clause in this section which provides that funds may be distributed upon some other basis, according to plans previously adopted by the board for vocational education, or by legislative authority if those plans have been approved by the Secretary of the Interior. They must be approved by the Secretary of the Interior, because otherwise funds might be diverted from the purposes contemplated by the bill.

It must be borne in mind that this bill is designed to stimulate and encourage and not to assume, except in a very slight degree, the main burdens of educational support; and after a State has made the proper preparation in the way of providing the required buildings and farm lands to enable it to take advantage of the act, there must then, in addition, be appropriated at least twice as much for these educational purposes as is contributed by the Federal Government. (533)

The bill was then withdrawn by unanimous consent and a substitute bill was reported June 14, 1912, which carried lump sums to each State for vocational education and teacher training but no appropriation for branch experiment stations.

This substitute bill had been drafted by the secretary of the National Society for the Promotion of Industrial Education, representatives of the American Federation of Labor and Prof. W. M. Hays, had been introduced in the House April 20, 1912, and discussed there in hearings before the Committee on Agriculture.

Meanwhile Senator Hoke Smith of Georgia and Representative A. F. Lever of South Carolina had introduced an agricultural extension bill, which was passed by the House of Representatives August 23, 1912. The Senate substituted the Page bill with additional amendments January 27, 1913. The Conference Committee of the two houses could not agree and the 62d Congress ended without final action on these measures.

The Page bill was introduced again in the 63d Congress April 7, 1913 but it was increasingly apparent that Congress would not pass this bill, especially since there was strong opposition to the uniting of appropriations for agricultural extension work and vocational education in a single bill. The proposition to create

a commission to study the situation with regard to vocational education and report recommendations which might aid in the solution of the problem of Federal aid for such education was therefore received with favor in Congress and the resolution for this purpose (See p. 854) was practically substituted for the Page bill.

The Commission on National Aid to Vocational Education

The law under which this commission was created simply made its duty "to consider the subjects of national aid for vocational education and report their findings and recommendations." (534) Its members, appointed by the President, were Hoke Smith of Georgia and Carroll S. Page of Vermont from the Senate; D. M. Hughes of Georgia and S. D. Fess of Ohio from the House of Representatives; John A. Lapp, director of the Indiana Bureau of Legislative Information, who had been secretary of the Indiana Commission on Industrial and Agricultural Education; Florence Marshall, director of the Manhattan Trade School, Miss Agnes Nestor, president of the International Glove Workers Union and member of the committee on industrial education of the American Federation of Labor, Charles A. Prosser, secretary of the National Society for the Promotion of Industrial Education, and Charles H. Winslow of the Bureau of Labor Statistics, who had been a member of the Massachusetts Commission on Industrial Education. It will be observed that the commission had no members from organizations specially interested in agricultural education. Senator Smith was elected chairman and Ernest A. Wreidt, director of the Public Education Association of New York City, was made its secretary.

The commission was not called together until April 2 and under the law was required to make its report not later than June 1, 1914. The enactment of the Smith-Lever Extension Act on May 8, 1914, enabled the commission to confine its investigations to the field of secondary school education. It studied the extent of the need of vocational education in the United States, the need of national grants for such education, what kinds of forms of vocational education

should be stimulated by national grants, how far can the Federal Government aid through export knowledge and to what extent should Federal grants be made and under what conditions? It therefore dealt with (1) National grants (1) to Federal agencies for information and advice, and (2) to the States. To gain information under the first head hearings and conferences with department officials at Washington were held; under the second head, in addition to hearings, a questionnaire was sent to State, city and county superintendents of public instruction and to National organizations of labor and to representative employees. The literature of the subject was also collated and studied as far as possible.

At the hearings before the Commission the Secretary of Agriculture was represented by A. C. True, Director of the Office of Experiment Stations, who explained what the Department of Agriculture was doing for the promotion of agricultural education and extension work. At another time Dr. True, in his capacity that year as president of the Association of American Agricultural Colleges and Experiment Stations, explained the work of these institutions relating to secondary education and the declarations of the association in favor of a system of public secondary education in agriculture, including special agricultural schools and the teaching of agriculture in the local high schools.

The standard agricultural courses whether in the ordinary high schools or in special schools, should not be narrowly vocational but should aim to fit the pupils for life as progressive, broad-minded and intelligent men and women, as well as good farmers and horticulturists. The standard courses in agricultural secondary schools should be so organized as to form a natural and proper preparation for entrance to agricultural colleges. (534)

The association declared in 1911 (and reaffirmed this declaration in 1912) that it favored "federal aid for public schools of secondary grade, providing secondary education in agriculture, home economics, the trades and industries, including manual training, and for the education and professional training of teachers for these schools in the several States, as may be determined by the legislature." This was confirmed by President W. O. Thompson of Ohio State University, chairman of the Executive Committee of the association, in a written

statement to the commission. Dean Eugene Davenport of the College of Agriculture of the University of Illinois also wrote to the commission his views regarding the use of the high schools, rather than special schools, for secondary vocational education and in another statement emphasized the "great need for national grants for vocational education, leaving the States free to determine the character and extent of the use of such funds but requiring them to devote at least an equal amount to the same general purpose. The Federal departments could be helpful by furnishing information and advice. Dr. P. P. Claxton, United States Commissioner of Education presented a list of the publications of the Bureau of Education on education in agriculture, home economics and the industries and emphasized his interest in the practical education of the rural people.

As the result of their intensive investigation the commission concluded that the kind of vocational education most urgently demanded was that which will prepare workers for the more common occupations in every part of the United States, to conserve and develop our resources; to promote a more productive and prosperous agriculture; to prevent waste of labor; to supplement apprenticeship; to increase wage-earning power; to meet the demand for trained workmen, and to offset the increased cost of living. National grants to the States were needed, especially for agricultural, trade and industrial education, partly for the preparation of efficient teachers and partly for the payment of a portion of the salaries of teachers in service. Such grants were justified by the urgency of the demand for the training of workers, by the interstate and National character of the problem, by precedents in Federal legislation and by the successful results of previous grants for education. National appropriations to Federal agencies should be "for studies, investigations and reports furthering the efforts of the States to place the work of their vocational schools on a scientific and business-like basis."

On this general basis the commission elaborated its report and submitted the draft of a bill to provide for the promotion of vocational education through the cooperation of the Federal Government with the States. The recommendations of the commission, as embodied in this bill, are summarized in their report as follows:

1. Scope of the grants

1. That national grants be given to the States for the purpose of stimulating vocational education in agriculture and in the trades and industries.
2. That grants be given in two forms:
 - a. For the training of teachers of agricultural, trade and industrial, and home economics subjects.
 - b. For the paying of part of the salaries of teachers, supervisors, and directors of agricultural subjects and of teachers of trade and industrial subjects.
3. That appropriations be made to a Federal board for making studies and investigations which shall be of use in vocational schools.

II. Amount of the grants

1. For the salaries of teachers, supervisors, and directors of agricultural subjects - that there be appropriated to the States the sum of \$500,000 for the fiscal year 1915-16; this amount to be increased at the rate of \$250,000 a year until a total of \$2,000,000 is reached in the fiscal year 1921-22, and thereafter the annual increase to be at the rate of \$500,000 a year until a total maximum appropriation of \$3,000,000 is reached in 1923-24.
2. For the salaries of teachers of trade and industrial subjects - that there be appropriated to the States the sum of \$500,000 for the fiscal year 1915-16; this annual amount being increased for each subsequent year in the same manner as the grants for the teachers of agricultural subjects, until the same maximum of \$3,000,000 is reached in 1923-24.
3. For the training of teachers of agricultural, trade and industrial, and home economics subjects - that there be appropriated to the States the sum of \$500,000 for the fiscal year 1915-16; \$700,000 for the fiscal year 1916-17; \$900,000 for the fiscal year 1917-18; \$1,000,000 for the fiscal year 1918-19, and annually thereafter.
4. For the work of the Federal Bureau for Vocational Education - that there be appropriated \$200,000 annually, this money to be used in administering the grants to the States and in furnishing information and advice to the States for use in vocational schools and classes.

III. Kinds of schools aided by grants

1. That the schools aided in part by the National Government should be schools supported and controlled by the public.
2. That the education given in these schools should be less than college grade.
3. That they should be designed to prepare boys and girls over 14 years of age for useful or profitable employment in agriculture and in the trades and industries.
4. That the schools should be of three types in order to meet a variety of needs:
 - a. All-day schools in which practically half of the time should be given to actual practice for a vocation on a useful or productive basis.
 - b. Part-time schools for young workers over 14 years of age, which should extend either their vocational knowledge or give preparation for entrance to a vocation or extend the general civic or vocational intelligence of the pupils.
 - c. Evening schools to extend the vocational knowledge for mature workers over 16 years of age.

IV. Administration

1. That the States, in order to receive national grants for vocational education, designate or create state boards, through whom the National Government would deal; the determination of such boards to be left entirely to the States.
2. That a Federal board be created, consisting of the Postmaster General, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of Labor, with the Commissioner of Education as its executive officer, to administer the funds and to cooperate with the States in promoting vocational education.

V. Conditions

1. That the Federal statute providing for national grants to the States for vocational education set up conditions safeguarding the proper expenditure of the money for the purposes designed and insuring a minimum degree of efficiency in the work.
2. That the States, through their legislative authorities, formally accept the conditions of the Federal statute providing national grants.
3. That the States provide for the proper custody and disbursement of the Federal grants allotted to them.
4. That the State board, with the approval of the Federal Board for Vocational Education, formulate plans for the administration of the grants in conformity with the provisions of the Federal Statute, and establish minimum requirements for the State as to the qualifications of teachers and the equipment of schools.
5. That for each dollar paid from Federal grants allotted to any State for the salaries of vocational teachers, or for the training of vocational teachers, the State or local community, or both, shall expend an equal amount for the same purpose, and shall in addition meet all other costs of plant, equipment, and maintenance, including the salaries of all teachers necessary to complete well-rounded courses of instruction.

6. That the State receive its allotment annually so long as it uses the funds allotted to it in conformity with the purposes and provisions of the Federal statute. Payment on allotments shall be made quarterly. (534)

The report of the Commission was printed and widely circulated but it was not thought best to attempt to secure the passage of the bill at the short session of the 63d Congress, beginning in December 1914.

President Wilson, in his message to Congress December 7, 1915, strongly favored Federal aid to industrial and vocational education as a means of making "the industries and resources of the country available and ready for mobilization."

The bill of the commission was introduced in the Senate by Hoke Smith Dec. 7, and in the House of Representatives by D. M. Hughes, December 19, 1915.

It was reported favorably in the Senate January 31, 1916 and in the House February 10, 1916. Amendments adopted in the Senate required the Federal Board to select a director, four specialists and an advisory council of seven persons representing various interests, and to permit the board to have departments of the Government make studies and investigations for it. The bill passed the Senate unanimously July 31, 1916. In the House Mr. Hughes as chairman of the Committee on Education explained the measure but the minority leader, Mr. Mann of Illinois asked that the bill be held until the short session and it went over. When Congress met in December 1916. President Wilson in his message said - This measure "is of vital importance to the country because it concerns a matter too long neglected, upon which the thorough industrial preparation of the country for the critical years of economic development immediately ahead of us in very large measure depend. It contains plans which affect all interests and all parts of the country, and I am sure there is no legislation now pending before the Congress whose passage the country awaits with more thoughtful approval or greater impatience to see a great and admirable thing set in the way of being done."

The House bill differed from the Senate bill by the substitution for the Federal board with five cabinet officers of a board comprised of the Commissioner of Education and four associate members, no more than two of whom were to be of any one political party, to be appointed by the President and each to have a salary of \$5,000 a year. Meanwhile there had arisen much sentiment in favor of a board containing representatives of different vocational lines. This was urged by the National Society for Industrial Education, the United States Chamber of Commerce, the American Federation of Labor, and other organizations. There was also strong opposition to a board in which the Commissioner of Education would be the executive officer for it was feared that this would result in defeating the distinct development of a system of real vocational education. On the other hand there were many people, including a large number of educators, who did not favor an organization of vocational education entirely separate from the general public school system. For a long time the problem of unified or separate control of vocational education had been debated in the National Education Association, the National Society for Industrial Education and elsewhere.

When the bill was discussed in the House an amendment offered by Mr. Lenroot of Wisconsin was adopted, which made the four appointed members representatives of manufactures, commerce, labor and agriculture respectively, and provided that the board should annually elect one of its members chairman.

When the bill went to conference it was understood that President Wilson was opposed to a board entirely separate from the Executive Departments.

The final result was a compromise by which the Federal board was made to consist of the Secretaries of Agriculture, Commerce, and Labor, the Commissioner of Education and representatives of manufactures and commerce, agriculture, and labor. This board, therefore, was put in control of representatives of the industries, including agriculture, but the public school system was represented by the Commissioner of Education as a member of the board.

In the States under this act the control of the funds for vocational education might be in a separate board of vocational education or in the general board or department of education as each State might determine.

The friends of home economics education were not satisfied with the provisions for that subject in the commission's bill, which were confined to the preparation of teachers. They therefore secured the addition of home economics to those sections of the bill which deal with the payment of the salaries of teachers in service, though not more than 20 per cent of the annual appropriation can be spent for the teaching of this subject.

Those who were opposed to the use of Federal funds by sectarian or private institutions obtained an amendment specifically stating that no portion of any moneys appropriated under this act shall be applied directly or indirectly "for the support of any religious or privately owned or conducted school or college."

The bill passed the House January 9, 1917, and was sent to conference.

The agreement reached by the conferees was adopted by both houses and the bill became a law through its approval by President Wilson February 23, 1917.

The Smith-Hughes Vocational Education Act

The passage of the Smith-Hughes Vocational Education Act practically created a system of vocational education of broad scope as a permanent part of the public school organization throughout the United States. It provided funds for the immediate extension of the efforts of the States in this direction and by a gradual increase of the Federal aid helped to put this system on a sound and substantial footing within a few years. It would then remain for the States and local communities, with or without additional Federal assistance, to increase the strength and scope of vocational education to meet the development of the various local vocations.

The act also exemplified a new phase of Federal cooperation with the States in educational work. In the Morrill land-grant act of 1862 the Federal Government gave lands to the States for colleges without requiring them to account for the use

of these lands. Later the Government gave money to the land-grant colleges for experiment stations and for instruction with limited but increasing requirements for Federal supervision. In the Smith-Lever Extension Act the extreme limit of Federal union with the States in an educational enterprise was reached. This act required cooperation between the Federal Department of Agriculture and the States as represented by the land-grant colleges, in providing funds and in planning and conducting extension work in agriculture and home economics. The plans adopted under this act have set up in the several States an organization representing both the State and the Federal Government. The work in each State is in charge of a director who is a joint representative of the State Agricultural College and the United States Department of Agriculture. He has the franking privilege and his salary comes from Federal and State sources. In the counties the agents generally receive part of their salary from direct appropriation to the Department of Agriculture and have Federal commissions and the franking privilege. Officers of the Department participate in the extension work in the State and all the extension work of the Department in the States is subject to the administration of the extension directors.

In the Smith-Hughes Vocational Education Act a more limited cooperation between the Federal Government and the States is provided for. In each State there is a board of vocational education and the Federal Board deals only with this State board and not with individual schools receiving the benefits of this act. The Federal funds are expended in accordance with plans submitted by the State boards and approved by the Federal board. The Federal authorities inspect the work and the expenditures in each State so far as to determine whether they come within the provisions of the law and entitle the State to reimbursement from the Federal funds. Beyond this the Federal Board has only advisory functions and aids the work in the States by furnishing information through publications or otherwise and by conferring with State officials in charge of different lines of work.

Secondary Agricultural Education under the Smith-Hughes Act, 1917-1925

On July 17, 1917, President Wilson, by and with the advice and consent of the Senate, appointed the following members of the Federal Board for Vocational Education; For one year, as representative of manufacture and commerce, James P. Munroe of Massachusetts, a graduate of the Massachusetts Institute of Technology and secretary of its faculty for several years and a prominent worker for many years in the movement for industrial education; for two years, as representative of agriculture, Charles A. Greathouse, of Indiana, who had been State Superintendent of public instruction for three years, as representative of labor, Arthur E. Holder, a machinist, who had been deputy commissioner of the Iowa Bureau of Labor and had represented the American Federation of Labor in National legislative matters. The ex-officio members were D. F. Houston, Secretary of Agriculture, W. C. Redfield, Secretary of Commerce, W. B. Wilson, Secretary of Labor and P. P. Claxton, Commissioner of Education. The first meeting of the board was held in the office of the Secretary of Agriculture July 21, 1917. Secretary Houston was elected chairman, Mr. Munroe vice-chairman and Commissioner Claxton secretary. The board appointed Charles A. Prosser director of its administrative staff, with the following assistant directors: Agriculture, Layton S. Hawkins of the New York State Department of Education; Industrial Education, Lewis H. Carris of the New Jersey State Department of Education; Home Economics, Josephine L. Berry, head of the home economics department of the College of Agriculture of the University of Minnesota; Research, Charles H. Winslow, director of vocational research, Indianapolis. Dr. Cheesman A. Herrick, president of Girard College, Philadelphia, was appointed temporary agent for commercial education.

For administration and inspection the country was divided into five sections, North Atlantic, Southern, North Central, West Central and Pacific and headquarters for agents of the board were established in New York City, Atlanta, Ga., Indianapolis, Ind., Kansas City, Mo., and San Francisco, Cal. From August 17 to 28,

1917, the board held conferences with representatives of the boards charged with the State administration of the Smith-Hughes Act at which "the purpose of the law was discussed with particular reference to the general principles upon which it is based and the methods by which these principles should be brought into practice." The first bulletin of the board was issued in November, 1917, and was entitled The Smith-Hughes Act: Policies of Federal Board for Vocational Education.

Among the policies announced at this time were the following:

The Federal board believes that the following fundamental principles should govern the appropriations from the National Government to the States for vocational education. The money is designed:

(1) To stimulate the States to undertake a new and needed form of service - that for vocational education - which the National Government believes necessary to the public welfare.

(2) To equalize, in part at least, the inequalities of burden among the States in carrying on this service.

(3) To purchase for the National Government a reasonable degree of participation in the carrying on of this work in which the National Government is so deeply concerned.

(4) To establish standards of efficiency in vocational education and to set up minimums below which work in vocational education for which reimbursement from Federal moneys is desired can not be allowed to fall.

Two questions must always be met in determining whether a State is entitled to share in the distribution of Federal funds -

(1) Is the plan proposed by the State one which the Federal Government is willing to accept?

(2) Will, or can, the State properly carry out the plan after the agreement is made?

In the matter of institutions using Federal moneys, the Federal board is concerned with three things -

(a) Whether the institution is legally qualified under the act.

(b) Whether supervision and inspection by the State board for vocational education is properly maintained.

(c) Whether the courses are carried on in conformity with the plan as agreed upon between the Federal and State boards.

No choice can be made or discretion exercised in dealing with mandatory provisions. For example, the board is charged with seeing that the States provide for at least six months of directed or supervised practice in agriculture and that the States provide instruction in the trades and industries for the persons who have not entered upon employment extending over not less than 9 months per year and for not less than 30 hours per week. Modification of such rules is impossible.

Concerning provisions where discretion and interpretation are allowed, the Federal board reserves the right to judge the arrangement made with each State in the light of local conditions, keeping in mind the fact that the standards in every State must be progressive and that no standard can be permitted to fall below a reasonable minimum of efficiency.

The Federal board desires to emphasize the fact that vocational schools and classes are not fostered under the Smith-Hughes Act for the purpose of giving instruction to the backward, deficient, incorrigible, or otherwise subnormal individuals; but that such schools and classes are to be established and maintained for the clearly avowed purpose of giving thorough vocational instruction to healthy, normal individuals to the end that they may be prepared for profitable and efficient employment. Such education should command the best efforts of normal boys and girls.

All official dealings must be between the Federal Board for Vocational Education or its representatives and the State boards for vocational education. Agents of the Federal board will deal with the State board or its recognized agents only, not with individual schools and institutions. The Federal board and its agents reserve the right, of course, to inspect from time to time such schools and institutions in order to determine whether or not the State is carrying out properly the plan agreed upon. This decision does not preclude the giving of advice to schools by the Federal board or its agents at the request of the State board or its agents. (63)

By January 1, 1918 each of the 48 States had through legislative enactment or the governor accepted the provisions of the Smith-Hughes Act, had submitted plans which met with the approval of the Federal Board and had been certified to the Secretary of the Treasury for the allotment for the fiscal year ending June 30, 1918. In 14 States a special board for vocational education was created or utilized; in 32 States the general State board of agriculture was designated to administer the Smith-Hughes fund; in Minnesota the State high-school board was utilized and in Colorado, which did not have a State board of education, the State Board of Agriculture had the administration of vocational education added to its duties as a supervisory board for the State land-grant college.

Meanwhile the United States had entered the World War and the War Department and the Shipping Board had called on the Federal Board for Vocational Education to aid in training conscripted men for the vocations required for military purposes or for shipbuilding. The problem of training disabled soldiers and sailors was also being considered in cooperation with other branches of the Government. This led to the vocational rehabilitation act of June 27, 1918 under which the administration of this work was committed to this board and formed a large, difficult and rapidly increasing feature of its work until it was transferred to the Veterans Bureau on August 9, 1921.

The rehabilitation work was distributed among schools and colleges in the several States. It included instruction in many occupations, among which were many branches of agriculture.

Conditions growing out of the war intensified the interest of the people of the United States in vocational education but also brought about unusual difficulties which for a considerable period prevented its most orderly and satisfactory development.

Agricultural Work of the Federal Board

The assistant director for agriculture, Mr. L. S. Hawkins, came into this work after several years experience as a specialist in agricultural education in the State Department of Education in New York, which had developed under State laws both special agricultural schools and departments of agriculture in a considerable number of high schools. He had also received part of his education in the State Normal School at Cortland, N. Y., and had been head of the department of science and agriculture in that school. He was thus familiar with administrative problems relating to State supervision of agricultural education and to the organization, equipment and curriculum for secondary instruction in agriculture. In 1916 he was the author of a bulletin, published by the University of the State of New York, which discussed these problems as related to the State laws on vocational education. A few extracts from this bulletin may serve to show his point of view with reference to some of these matters.

No teacher should be engaged for vocational work who has not a special authorizing certificate, which requires, generally, evidence of graduation from an approved high school, or the equivalent, and also from an approved professional institution wherein he completed a four-year course of study in the subjects to be taught.

A teacher of agriculture should be thoroughly conversant with farm life, either through his home life or extended experience working on a farm.

A teacher of agriculture in a secondary school is not to be a specialist in one or two agricultural subjects but should have a good general knowledge of the entire field, including soils, animal husbandry, dairy husbandry, poultry husbandry, farm crops, fruit growing, plant diseases, farm machinery, etc.

A teacher of agriculture should have some knowledge of the science and art of teaching, gained either through special study or from teaching experience. A thorough knowledge of agriculture may be of little use unless the teacher has also some knowledge of how to direct the activities of pupils.

A teacher of agriculture should understand the intent of vocational educational agriculture, should be familiar with the farm home and should understand the problem of connecting the school work and the home activities of the pupils.

A teacher of agriculture should have some knowledge of mechanical drawing, woodworking and elementary blacksmithing.

The classroom and laboratory instruction in these schools and departments is to be based upon the practical experience gained on the farm, at home, or elsewhere.

A well-balanced general knowledge of the entire field of agricultural science and practice should be represented in the curriculum.

It is an essential part of the organization of the school that the teacher of agriculture be employed for service during the summer months.

The following are some phases of summer work suggested for the teacher of agriculture: (a) supervision of home project work carried on by boys who are enrolled in the school; (b) supervision of experiments or projects undertaken by boys or young men not in school but who may be interested: some of these boys may decide to enter school later; (c) collecting material for classroom and laboratory use the following year; (d) locating objective points and making arrangements for field trips to be taken the following year; (e) assisting local farmers to solve some of their troublesome problems when these farmers request such aid.

The school may use a small plot of ground to advantage, but it is not necessary for it to have a farm. The teacher and pupils are expected to make use of the nearby farms and their equipment for much of the laboratory instruction. Pupils are also expected to make use of their home farms in the required project work. (348)

Charles H. Lane became a member of the agricultural staff of the Federal Board by transfer from the Office of Experiment Stations of the Department of Agriculture where for several years he had had charge of its work relating to agricultural education. He was therefore thoroughly familiar with the status of teacher-training in agriculture and agricultural instruction in secondary schools throughout the country. Another member of this first staff was William G. Hummel, a graduate in agriculture at the Universities of Illinois and California, who had taught agriculture in high schools in California and had been for seven years teacher of agricultural education in the University of California.

The board immediately undertook investigations on the organization of secondary schools in agriculture, including courses of study and supervision; materials and methods in secondary school agriculture, and supervised practical work in agriculture, including the home project method of instruction. The results of this work have been published in a series of bulletins.

The first bulletin in the agricultural series was prepared by Mr. Hawkins and published in March 1918 on the organization and administration of agricultural edu-

cation under the Smith-Hughes Act. (618) It explained the requirements of that act and also in a measure set up standards for the school plant and equipment, courses of study, qualifications of teachers in the secondary schools, and the training of teachers for such service. This was followed in June 1918 by a bulletin prepared by Mr. Lane on reference material for vocational agricultural instruction, which described the nature and sources of such material available to the schools and sug-

gested a method of filing and cataloguing it for school use. (621) In December, 1918 a bulletin on some problems in State supervision was issued. (614) In Part 1 Mr. Hawkins

described the essential factors in the success of a State program of vocational education and the qualifications and duties of the State supervisory staff; in part 2, George A. Works, professor of rural education in the New York College of Agriculture, discussed the relationship between teacher-training departments and the State supervisors of agriculture; and in part 3, Mr. Rufus W. Stimson, State supervisor of agricultural education in Massachusetts, treated of sectional conferences and periods of professional improvement work for teachers of agriculture in high schools, with special reference to the plans for such work in Massachusetts.

After five years of the development of vocational education in agriculture Prof. Charles E. Myers of the department of rural life of Pennsylvania State College was employed to make a study of the effectiveness of vocational education in agricul-

ture, the results of which were published in May 1923. (626) A bulletin on the aims and values of supervised practice in agriculture and the responsibilities of pupils, teachers, State administrators and local boards of education in relation to such

practice was issued in June, 1923. ^ The principles underlying the distribution of aid to vocational education in agriculture were discussed in another bulletin of that date on the basis of a study by Frank W. Lathrop, assistant professor of agricultural education in the University of Minnesota of the methods of distribution practiced in the several States. (622)

The methods of organizing and conducting agricultural evening schools and suggestions for the content of their courses were set forth in a bulletin issued in November, 1923. ^ Two bulletins on agricultural teacher-training were issued in 1923 and 1924, treating of the principles of organization of such work and its status, developments and methods. (615)

By cooperation with the States Relations Service of the Department of Agriculture a bulletin on the home project as a phase of vocational agricultural education, by F. E. Heald, specialist in agricultural education in that service, was published in September 1918. (619)

Cooperation has been continued with the Department of Agriculture, through its division of agricultural instruction, on the subject-matter of secondary instruction in agriculture. Outlined lessons on plant and animal production were prepared by Dr. E. H. Shinn and unit courses in poultry and swine husbandry were prepared by Mr. C. H. Schopmeyer. ^ These led to attempts to make job analyses of various agricultural enterprises. With the cooperation of specialists in the department and members of the staff of the Federal board, Mr. Schopmeyer has prepared bulletins containing analyses of potato growing, poultry husbandry and the management of a farm business ^ and Mr. F. A. Merrill has prepared job lesson units for selected truck and fruit crops adapted to southern conditions. (625)

Much information regarding the development of agricultural education under the Smith-Hughes Act is contained in the annual reports of the Federal board and its Yearbook for 1923 gave in considerable detail a description of outstanding developments and summary of progress by States.

Through its publications and participation in conferences with State supervisors and school officials and teachers the board has done much to determine and improve the standards for secondary education in agriculture in the United States. Its careful and impartial examination of the plans submitted by the State boards, and its inspection of the accounts and work in the several States have also contributed toward firmly establishing a good system of vocational education in agriculture. The following statements in the annual report for 1923, while made with reference to vocational education in general, apply well to the methods and results of the work of the board relating to agricultural education.

An outstanding feature of experience under the vocational education act has been the tendency to bring vocational education everywhere in the States under the dominance of standards developed out of the cooperative efforts of Federal, State, and local agencies.

In this cooperative enterprise for the promotion of vocational education the Federal board rendered service principally as a clearing house of experience in the several States.

It provides the 48 States with an agency of cooperation, of conference, and under public supervision and control. In addition, to the full measure of their capacity, the Federal board and its staff undertake to develop intelligent leadership by contributing to our national program the results of research and of demonstration work conducted in the States. Practically all of the research of the Federal board develops out of experimental tests made in the field, followed by demonstrations of methods found valid by actual test, and ultimately by making these methods available for adoption in those States which may find them adapted to their needs.

Promotion of vocational education under the Federal act is thus in every aspect of it the result of cooperation to develop leadership and effective administration out of the diverse experiences of the thousands of vocational teachers and administrators working under State plans and economic conditions which vary from State to State. (616)

Relation of Vocational Instruction in Agriculture to Extension Work

As the number of schools receiving the benefits of the Smith-Hughes Act increased the teachers of agriculture in these schools came frequently into contact with the extension agents operating under the Smith-Lever Act. On their own initiative or by request of the people in the vicinity of the school Smith-Hughes teachers in a number of places undertook extension work among the farmers. In some cases the number of students taking agriculture in the school was small, while the salary of the teacher was relatively large. This made vocational education in

agriculture expensive and the community therefore felt that it was entitled to services from this teacher outside of school. School officials and teachers sometimes raised the academic question whether extension work in agriculture, particularly boys' and girls' club work, did not really belong to the public schools, rather than to the agricultural colleges. This situation was aggravated in some cases by the extravagant claims of extension agents regarding the scope of their work, particularly with young people. While there was much friendly cooperation between teachers and extension agents, personal jealousies and antagonism made discord in various places.

This matter was brought to the attention of the Federal board and the Department of agriculture and seemed to them to be of sufficient importance to call for a declaration of their policy regarding it. Therefore on February 21, 1918 they agreed to a "memorandum on instruction in vocational schools and extension work in agriculture," (See Report of Federal board 1919, p. 42.), which after setting forth the general nature of the work called for under the Smith-Hughes and Smith-Lever Acts, dealt with the relationship of the two lines of work, as follows:

In many counties of the various States there will be the cooperative agricultural extension system conducted by the State agricultural college in cooperation with the United States Department of Agriculture and the county under the provisions of the Smith-Lever Extension Act and under other Federal and State legislation. There will also be vocational agricultural instruction carried on by the State board for vocational education in cooperation with the Federal Board for Vocational Education and the county or the local school district under the provisions of the Smith-Hughes Act. Both the extension service and the vocational instruction will deal with both adults and children.

In each State there is a State director of agricultural extension service and an executive officer of the State board for vocational education. It is suggested that these two officials determine upon a plan of cooperation for the State based upon the following general policies or principles:

(1) It is to be understood that all agricultural extension work should be administered by those in charge of extension activities in the State and that all vocational education in agriculture should be administered by those in charge of the vocational schools of the State.

(2) That all extension work with adults done by teachers in vocational schools be in accordance with the plans of the extension system for the State, and in cooperation with the agent who is in charge of the administration of the extension work in the county.

(3) That in counties having vocational schools of agriculture the extension service will conduct its extension work in agriculture with children chiefly through the organization of clubs for the carrying on of definite pieces of work for the improvement of agricultural practice. The practical agricultural work of the schools will chiefly consist of home project work by the students as a part of the systematic practical instruction provided for in the Smith-Hughes Act. It is advised that in such counties a cooperative agreement be made between the extension authorities and the school authorities whereby it will be arranged for the teachers of agriculture to take part in the extension activities with the children within the territory of the school and that such territory be set forth in the agreement.

(4) That in every case care be taken to see that work which is supported by Federal funds under any of the aforementioned acts will not in any way duplicate or overlap work being carried on in that same community when that work is supported in any part from another Federal fund. (616)

This statement helped to bring about more or less satisfactory agreements between the vocational education and extension forces in a number of States and there was also a general tendency toward improved relationships as the work of the two agencies progressed. But there remained sufficient unrest regarding various phases of this problem to bring about other formal attempts at its solution.

At their annual meetings in 1920, both the agricultural section of the National Society for Vocational Education and the department of rural education of the National Education Association independently voted to create committees on this subject, but later the committee appointed by the former society was asked to serve also as the committee of the latter organization. Its report in February 1921 was accepted as a progress report and the Association of Land-grant Colleges was invited to join with the other two organizations through a joint committee. Later a committee of the Association for the Advancement of Agricultural Teaching was invited to sit with this joint committee. There were 14 persons, representing the four organizations, who joined in the final report adopted May 9 and 10, 1921.

(Proceedings of Association of Land-grant Colleges, 1912, p. 232.) Dean A. R. Mann of the New York College of Agriculture was chairman of the joint committee. Their report was based on the memorandum of the Department of Agriculture and Federal Board for Vocational Education cited above and "in the light of subsequent experience" offered "explanations and interpretations of the foregoing memorandum as tending to facilitate sound and harmonious adjustments with the States."

After briefly describing extension work and public school education in agriculture and home economics the committee proposed the following basis for agreements in related lines of work:

It is recognized that the functions, obligations, and responsibilities of the parties to the agreement, as defined by law, may be similar, with the possibility of overlapping, as in the fields of (1) the junior project work of the schools and the junior extension (boys' and girls' club) work of the college both in agriculture and home economics, (2) the part-time and evening home-making courses of the State board for vocational education and the home economics extension work of the colleges and (3) the short-unit courses in agriculture and home economics, in the public schools, and the extension classes conducted by the land-grant colleges. In a spirit of fairness to both groups of interest, this report seeks to present a basis for clear differentiation of the functions of the respective agencies in these closely related tasks. It is proposed that the work in these related fields shall be made a matter of cooperative agreement in the several States. Such cooperative agreement should recognize the following facts and principles:

- (1) It is the function, duty, and responsibility of the public school to provide education for all children, and to provide such adult education as is authorized by law.
- (2) Under the law, it is the function and duty of the land-grant college of agriculture to maintain extension service. The theory underlying extension service is that it is, first, to provide supplemental education for persons engaged in agriculture and home-making, and, second, to enable the college and the Federal Department of Agriculture to bring their advances in knowledge to farmers and their families who can make the applications. Furthermore, by virtue of its staff of technical specialists and its responsibility for training vocational teachers, the land-grant college is in a position to furnish technical information and advice in the fields of agriculture and home economics to vocational work in the schools.
- (3) It is clearly recognized and affirmed that the college of agriculture is the source and authority, in the State, in technical subject matter in agriculture and home economics. The principle should be clearly observed that neither the State nor any lesser administrative unit charged with the supervision of vocational education, should employ any itinerant subject-matter specialists for the purpose of giving technical instruction in any phase of agriculture or home economics. In so far as the vocational schools may have need for the assistance of technical specialists other than the regular vocational teacher or teachers in the local schools, they should look to the college of agriculture to supply such specialists. If, by reason of limitations of funds, the college is unable to meet all demands for aid on technical matters, the remedy is to be found in strengthening the resources of the college to fully meet the requirements, and not in establishing subject-matter specialists as part of the State vocational system.
- (4) There are three types of situation to be considered: (a) Where agricultural and home economics education is fully developed by the local schools, (b) where such education has not yet been undertaken by the local schools, (c) where such education is in process of development by the local schools.
 - (a) Where the school provides a comprehensive program of agricultural and home economics education which meets the needs of children and adults, through systematic instruction and supervised practice, the extension forces of the land-grant colleges shall not duplicate such work of the schools, but shall rather cooperate with the schools by providing, on

request, subject matter, special lecturss, conferences, and other similar services. This shall not be interpreted to limit the freedom of the extension forces to prosecute their extension work through local organizations and of farmers.

(b) Where the school does not provide such a program of instruction in agriculture and home economics, the extension service of the college should organize extension work. In such localities, the school should give its fullest support and cooperation to the extension workers.

(c) It is recognized that, in some places, schools will be in the process of developing such educational programs. In these cases, the following principles should apply: Extension workers should confine their work with children to those whom the school does not enroll in systematic vocational or prevocational project work, including supervised home practice: unless requested or authorized by school authorities to enroll them. The school should organize its work with adults to provide systematic vocational instructions defined herein. The school should offer its facilities to the junior extension worker wherever the school has not, in reasonable operation, vocational or prevocational project work accompanied by supervised home practice.

- (5) Before undertaking junior extension work in any county, the extension division should submit in writing to the county superintendent of schools, the plans proposed for junior extension in that county, and should endeavor to arrange for a basis of understanding and cooperation. Copies of plans, when agreed upon, should be filed with the State department of education for consideration, before being put into operation.
- (6) The State department of education should look to the land-grant college to furnish technical subject matter in agriculture and home economics in the form of outlines, leaflets, and bulletins for use in the public schools. It is understood, however, that no such material in agriculture and home economics should be used in the schools until approved by the State department of education.

The committee also recognized that

The highest service in this great field will spring from a spirit of copartnership, of mutual respect, and from intimate association on a clearly defined basis, with the single purpose of serving the complete vocational needs of the communities. When both of the agencies shall have been fully developed on a carefully adjusted basis, there will be large place for them both in every community. (635)

In 1925 both agencies were far from filling their respective fields. In its report for 1924 the Federal Board made the following statement:

<u>Approximate number eligible for training and number and per cent reached</u>			
	<u>Total</u>	<u>In classes of vocational agriculture</u>	<u>Per cent reached</u>
Farm boys in school	978,371	66,485.....	6.79
" " out of school (14-20 yrs.)	1,202,135	3,294	0.27
Men on farms (over 20 yrs.).....	3,309,538	15,560	0.18

That year about half a million boys and girls were enrolled in the extension clubs.

Work in the States under the Smith-Hughes Act

During the first year after the passage of the Smith-Hughes Act 40 States began or further developed the training of teachers of agriculture and organized vocational agricultural instruction in schools. Within the next five years all the States were engaged in both these lines of work.

Teacher-training (See also p. 717)

In 36 States the agricultural college was designated in 1918 by the State board as the teacher-training institution; in Kentucky, Mississippi and South Carolina the agricultural college for negroes and in Illinois two normal schools were added. In 1919 the number of teacher-training centers had increased to 60 in 45 States, leaving Arizona, Nevada and Texas without such work. In 9 southern States the negro agricultural college had been designated and in Massachusetts and Illinois there were two institutions. In Georgia, Ohio and Tennessee there were three. In 1920 all the States except Nevada had teacher-training institutions and their total number was 64. 11 Southern States and Rhode Island, New Jersey and Minnesota had at least 2; Arkansas had three and Virginia four. The number of the institutions increased to 78 in 1923 but dropped to 68 in 1924, when all the States were engaged in this work. Outside of a few normal schools, only the land-grant colleges for whites and negroes received Federal aid for teacher-training since they alone had sufficient agricultural equipment and personnel to enable them to give satisfactory training for teachers of agriculture in secondary schools.

The number of teachers of teacher-training courses in agriculture was 222 in 1919 and 241 in 1924. That year the number ranged from 1 in Arizona, Delaware, Louisiana, Maine, Nevada and New Mexico to 10 in Colorado, 11 in New York, 15 in Massachusetts, 18 in Illinois and 22 in California. The students in teacher-training courses numbered 1,289 men and 45 women in 1919 and 4,692 men and 55 women in 1924, when the number in the several States ranged from 4 in Nevada to 869 in Iowa. There were from 1 to 5 women students in 7 States and 35 in California. In 1918 \$121,140.44

(including \$56,642.27 of Federal money, \$53,023.21 of State money and \$11,578.32 of local money) was spent for teacher-training in the 48 States and \$756,354.08 (including \$342,307.91 of Federal money, \$313,980.80 of State money, and \$100,015.37 of local money) in 1924.

The effect of the Smith-Hughes Act on the teacher-training work in agriculture of the institutions receiving the benefits of this act was immediately to enlarge and strengthen their work in this direction, with special reference to its application to the problems of secondary education. The training became more distinctly vocational in the sense that it had more definite relation to farm practice. At the same time there has been a growing realization that farm boys and girls should not only be taught and led to practice the best modes of farm operation but should also be instructed in the scientific, economic and social aspects of agriculture and country life. Teachers of agriculture should therefore have a broad training in the principles and methods of education and their applications to agricultural teaching, and in science, economics and sociology, as well as in the science and practice of agriculture. This really calls for more than an undergraduate course for the prospective teacher of agriculture and yet under present conditions the great majority of students in the teacher-training courses are not able to go beyond the four-years course for the bachelor's degree. One special difficulty relates to practice teaching as a part of the course. There is also a fundamental difficulty in that the teaching of agriculture has not been well organized on the basis of the problem method and yet the home-project work called for under the Smith-Hughes Act makes it essential that agricultural instruction in the secondary schools should very largely be based on the practical projects of the students. It is therefore not surprising that the different States have attempted to solve the practical problems involved in the organization and conduct of their teacher-training work in agriculture in various ways and it cannot yet be said that such training is standardized. Practically all the States require a four-years course in agri-

culture and from 9 to 20 hours of professional work in education. In a few States there is definite encouragement of at least a year of graduate work. Supervised practice teaching is generally required, either in the community where the college is located or in selected high-schools outside. In 1923 the Federal Board reported that

Fairly typical vocational departments of agriculture are available for practice and observation work. During the past year greater attention has been given to the matter of practice in the more practical phases of the teaching job, such as supervising home projects and doing community work. The administrative organization of this feature of the training program varies considerably from State to State. In some instances the critic teacher is a member of the teacher-training staff. In others he has no relation to the teacher-training institution. There still seems to be a difference of opinion among teacher trainers as to the desirability of conducting the observation and practice work concurrent with the special methods course. The principle of cadet teaching is on the increase in that more States are reported as having sent several men into selected high schools for fairly extended periods of experience. (616)

There has been a growing realization that the duty of the teacher-training institution is not finished when the student graduates but that it extends to the giving of assistance to the teacher in service. This is partly accomplished by summer sessions at the college but also in other ways. A few institutions have a regular system of what is known as itinerant teacher training.

It ordinarily means individual instruction of the teacher at the school he serves by a competent person whose duty it is to carry on such work where needed. It implies going here, there, and everywhere in a State where a teacher is not doing the desired kind of work, and staying with him, or going back to him until he gains enough additional knowledge and skill to meet his problems more efficiently. The third effective means for the professional improvement of agricultural teachers in service is the State and sectional meetings of agricultural teachers for conference, demonstration, and practice. (Federal Board Report 1924, p. 87) (616)

State
State Supervision

Before the passage of the Smith-Hughes Act only Massachusetts, New York, Pennsylvania, Indiana and Wisconsin had provided adequate supervision of agricultural education conducted with the aid of State funds.

The instruction in agriculture in the other 34 States granting aid for agriculture in high schools was supervised by deputy commissioners of education, professors of secondary education, high-school inspectors, and professors of agricultural education connected with land-grant colleges.

At the beginning of the five-year period of the administration of the Federal vocational education act some States made temporary arrangements in securing supervision and inspection of instructors through competent persons detailed from State

institutions or through the use of persons already in the employ of the State board in some other capacity. (Federal Board Report 1922, p. 37) (616)

In 1918-19 thirty States had full-time and 18 had part-time supervisors.

The latter were usually persons engaged in teacher-training at the land-grant colleges. In some cases the office of the full-time supervisor was in the college building where the teacher-training work had its headquarters. Under the conditions in some States there was considerable advantage in having close contacts between the teacher-training and supervisory organization for in this way information regarding the needs and progress of the work throughout the State was quickly made available to the teacher-training division and the supervisors were kept informed regarding the requirements and the progress in the development of teachers for the schools.

In 1922 there were 42 full-time and 27 part-time supervisors.

In general, supervision has been conducted by personal conferences of the supervisor with the teachers, special preparation of material in the way of outlines for directed or supervised practice in agriculture, bulletins covering the main points in the administration of vocational agricultural education in the State, blanks for reports from the schools to the State Board; through community surveys to determine how best to adapt the vocational agricultural instruction to the needs of the vocational pupils in the State, and through State-wide, regional, and sectional conferences. (Federal Board Report 1920, p. 79.) (616)

Attention was often given to promotional work, improvement of the content of the course of study, methods of instruction, supervised practice, part-time instruction and improvement of the system of reports and records. Because there have been many inexperienced teachers and the force has been rapidly changing, much attention has had to be given to the solution of specific problems arising in connection with the work in different localities. Successful experience in teaching agriculture has therefore been of great advantage in the case of supervisors.

Agricultural Instruction in the Schools

Even before the passage of the Smith-Hughes Act it was evident that most of the secondary instruction in agriculture would be given in the local high schools. This plan for such instruction was greatly helped by the provision in that act for practical farm work during six months. While the special agricultural schools have much more extensive equipment of buildings, farms, animals, machinery, etc. and a larger agricultural faculty they can not provide any large amount of practical work on the school farms in case they have many students. From the beginning of the operation of the Smith-Hughes Act the number of schools in which departments of vocational agriculture were established was very much greater than that of the special schools receiving Federal aid. There are only about 170 special agricultural schools in the United States but in 1918 according to the records of the Federal Board 609 schools received Smith-Hughes funds and this number steadily increased until in 1923 there were 2,673. These schools ranged from small institutions in the open country to large high schools in villages or cities. Most of the schools employ only one teacher of agriculture. The total number of these teachers in 1923 was 3,012. Their departments of agriculture

are in the nature of part-time schools of the occupational extension type, the instruction being designed to supplement the employment of the pupil on the home farm. In order that these schools may really carry out this type of instruction it has been found necessary to limit the attendance upon vocational agricultural classes to pupils who are actually engaged in some form of farm work. In most cases these schools or departments offer two, three, or four year courses for 36 weeks in the year with half of the pupils' time given to nonvocational high-school subjects. The work in vocational agriculture is usually accepted as a part of the high-school course, thus enabling the pupils completing the vocational agricultural work to secure not only the agricultural certificate but also the diploma granted by the school. The group reached by this instruction is usually composed of pupils who would ordinarily be enrolled in other high-school courses.

A few of the States have made provision through short winter courses and evening courses to reach another group which consists of those who have definitely dropped out of school and would not otherwise be receiving school instruction of any kind. There is an increasing number of States making special effort to reach this group.

* * *

The secondary schools of agriculture now recognize the fact that it is impossible for them to cover the whole field of agricultural instruction even in a four-year course. Vocational schools generally now emphasize the phases of agriculture dominant in the community and give less attention to other phases of agriculture which are not so important in that community. As a result there is a tendency to formulate the instruction in a given school on the basis of the agricultural needs of the community.

The secondary school of agriculture is rapidly ceasing to adopt a dilute form of the college of agriculture curriculum. The instruction is being limited to the well-established practices which are based upon experience as well as upon the results of college and experiment station work. Experimentation is more and more being left, as it properly should be, to other institutions. * * *

The vocational agricultural school is also having a marked effect upon the character and content of the instruction given in such sciences as botany, zoology, chemistry, physics, and physical geography. Science teachers in the rural high schools are relating their instruction to the fields of agriculture and home economics. * * *

With few exceptions the State plans provide as the qualifications of teachers of vocational agriculture graduation from a four-year college course planned for the training of teachers of vocational agriculture and at least two years of practical farm experience. (Federal Board Report 1919, pp. 37-39.) (616)

In 1922 the Federal Board reported that

Progress in connection with the use of courses of study during the five-year period just passed is marked by the fact that a majority of States are now adapting courses to local conditions instead of requiring rather formal and basically uniform courses for a whole State, as was the case in many instances formerly.

This adaptation indicates a shift from a subject matter viewpoint to a vocational viewpoint in the selection and organization of content of instruction. The futility of trying to "cover" the whole field of agricultural subject matter in a topical way with a view to giving the pupil a broad general knowledge which will function in farming has become apparent. Instead, attention has been directed toward those farming enterprises which are important in the respective local communities and, on the basis of these concrete studies and experiences, to the building of those broader generalizations and to the tracing of those essential relationships which will bring the specific instruction to a larger fruition. Furthermore, from a practical viewpoint such enterprises not only furnish the necessary objective teaching material but also the facilities for the most desirable type of supervised practice.

The methods of adaptation [of instruction to local conditions] commonly used are: The survey of farm enterprises of the community, the organization of courses on the basis of farm enterprise, the formulation of courses of study by the local teacher, which courses are later approved or modified by the State supervisor.

The results of this adaptation are: Increased interest on the part of pupils in the work studied: vocational education in agriculture which actually functions in the community and which, as a result, elicits the support of farmers; and, on the whole, more thoroughgoing and efficient work done by the teachers. (616)

The importance of the supervised farm practice as an essential feature of secondary instruction in agriculture with a vocational aim has been more fully recognized as the work under the Smith-Hughes Act has progressed. The home project is required equally in connection with all-day, part-time and evening instruction. But there is an increasing demand to go beyond the formal requirements of the Smith-Hughes Act as regards farm practice. This is shown in two important ways, as reported by the Federal Board in 1923:

1. That the students are being required in some cases, and requested in others, to participate in practical work, other than the assigned home project. Such practical work has been largely on the job basis and has been for the purpose of developing skills and giving experience in the doing of those jobs in which the pupil has not had experience or is not skilled. Such practice has been conducted both on the home farm and on the farms of the community under the supervision of the agricultural teacher.

2. That interest in group or class projects has increased. These have been organized for two main reasons: (a) For the purpose of giving the pupils experience in cooperative effort, and (b) to provide satisfactory supervised farm practice where the same can not be provided on the home farm, or - as in the case of town pupils - where it can not be provided at all.

In addition to the foregoing significant factors increased interest is noticeable in the effort to enlarge the scope of the individual farm practice of the pupils. The financial returns of supervised farm practice have grown to the extent of equaling the amount of money - Federal, State, and local - that was expended for salaries of teachers of vocational agriculture.

State reports show that the labor income for supervised farm practice in all-day white schools on the part of vocational pupils amounted to \$2,953,566.87 for the fiscal year 1921-22, while for the previous year it was \$1,985,976.70, giving practically a 66 per cent increase.

It will be observed that vocational education in agriculture combines learning with earning through a definite piece of work in the conducting of which ownership, correct business methods, managerial ability, economic profit, and study are recognized. (616)

In 1922-23 the 57,099 students enrolled in project work used 134,904 acres of land, 72,741 animals and 691,808 birds. The previous year 79 per cent of those enrolled completed their projects, with a total labor income of \$3,573,321.50 or about \$96 per student.

Most of the instruction given under the Smith-Hughes Act has been through all-day courses given to children regularly attending school. But young people out of school and employed on farms as laborers or tenants may come back for part-time or short courses and more mature men and women who are farm tenants or owners may

come to evening classes. The part-time courses cover from 2 weeks to 3 months and from 4 to 8 hours per day. The instruction outside of the regular courses is often given through short unit courses dealing with particular farm enterprises, such as potato growing, milk production, poultry husbandry, etc.

In 1919 there were 117 part-time and short-course classes with 2,487 students and 59 evening classes with 1,541 students. In Pennsylvania a county vocational teacher was employed as assistant to the county superintendent of schools and gave short unit courses in several township high schools. These courses covered a minimum of 90 minutes a week in the classroom and at least 6 months of supervised practice in agriculture.

In 1920 17 States had 197 part-time classes with 3,907 students and in 1921 34 States had 468 part-time classes with 7,043 students. In 1921 there were 110 evening classes with 1,564 students and in 1923, 358 classes with 9,319 students.

In 1924 there were 62,912 boys and 2,446 girls studying agriculture in all-day schools, 2,143 boys in part-time classes, 3,063 boys and 193 girls in short unit courses and 13,248 men and 1,979 women in evening classes. In all there were 85,984 persons receiving instruction in agriculture under the Smith-Hughes Act, as compared with 15,453 in 1918.

Special efforts have been made to develop instruction in vocational agriculture for negroes in the Southern States. It has been impracticable to get an adequate supply of well trained teachers but their number is increasing. Teacher training is done in the land-grant colleges for negroes and at Hampton and Tuskegee Institutes. "Thirteen of the sixteen States which have vocational agricultural work have employed a negro teacher trainer, who spends a part of his time visiting the vocational agricultural departments of the different negro schools and assisting in the improvement of teachers in service." The white supervisors also have actively promoted the negro work. In 1922-23 there were 202 departments of vocational agri-

culture in negro schools, with an enrollment of 4,880. There were also 9 part-time schools with 201 students and 18 evening classes with 813 students. In the project work 5,656 students were enrolled. In 1921-22 78 per cent of the negro students completed their projects with a labor income of \$332,457.21. Since very few negro farm boys enter high schools it has been necessary to carry on the vocational agricultural instruction in the grades and the schools for this purpose have been carefully selected.

The most successful work of this kind has been done with pupils whose parents are land owners. It is very difficult to reach the renters on the large plantations.

The influence of the Smith-Hughes work has gone beyond the schools receiving funds under that act. Incomplete statistics published by the Federal Board in 1924 showed that in 13 States there were 227 schools ^{for negroes without Federal aid} with 197 teachers and 3,656 students in courses of vocational agriculture. Ninety of these schools were receiving State aid.

The amount of Federal funds available for vocational education in agriculture in secondary schools increased from \$547,027.79 in 1918 to \$2,036,502.12 in 1924. There will be a further increase to \$2,526,826.66 in 1925 and the maximum of \$3,021,887.39 will be reached in 1926. In 1916 50 per cent of the available amount was expended in the States and 94.9 per cent in 1923. That year the Federal funds were used as follows: For supervisors \$31,612.67, evening schools \$38,504.07, part-time classes \$22,753.08, short unit courses \$21,909.35, all-day schools \$1,554,919.58. The total cost of agricultural instruction in 1923, was \$4,647,042.04, of which \$1,669,698.75 was Federal money, \$1,108,461.22 was State money and \$1,868,882.07 was local money.

The results of five years work of the schools receiving the benefits of the Smith-Hughes Act are summed up by Professor Myers in the report on his study of the effectiveness of vocational education in agriculture. ⁽⁶²⁶⁾ Reports from 722 schools in 35 States showed 8,340 persons out of school, who had had one or more years of

instruction in vocational agriculture. On the average these persons had spent 2.7 years in high school, during which time they had been in agricultural classes 1.7 years. 15.7 per cent of them had had 3 or 4 years of agricultural instruction and of these 80 per cent had graduated. Of the total number of students 50.4 per cent had graduated and 22 per cent went to college. Of those who went to college 36.5 per cent went to agricultural colleges. 4,488 or 54 per cent of the total number were engaged in farming, though 13.6% of the farmers had followed other pursuits for a time. Of the total number 5 per cent were in occupations related to agriculture, 8 per cent had gone to agricultural colleges, 14 per cent to non-agricultural colleges, 10 per cent were in non-agricultural occupations and 9 per cent were not accounted for. 311 had become teachers in rural schools. Of the farmers 10 per cent were owners, 6 per cent managers, 7 per cent renters, 48 per cent partners, and 29 per cent laborers.

The general status and the room for expansion of the American system of vocational education in agriculture was summed up in Department of Agriculture Yearbook for 1923 by the late Secretary of Agriculture, Henry C. Wallace, as follows:

As one of the representatives of agriculture on the Federal Board for Vocational Education let me express my pleasure at the gratifying progress shown by our public schools in the field of agricultural vocational education.

In this country we have 6,400,000 farms producing about \$14,000,000,000 worth of agricultural products. There are between 300,000 and 400,000 new farmers taking up the management of a farm for the first time each year. For the most part these new operators are the sons of farmers who have had experience on their fathers' farms but have not had organized instruction that would fit them to operate farms in keeping with the change in agricultural conditions. This phase of education has been neglected for many years, but happily the passage of the Smith-Hughes Act has at last set up a system of education to meet these needs.

The agricultural and home economics vocational education work of these schools must grow. To meet the needs of this country it means that some day when this system of education is completed we must be able to turn out from 300,000 to 400,000 young men and the same number of young women each year who will be trained through class-room instruction and home projects to operate farms and farm homes. If it requires four years to train young men and young women to properly take their places in the farm community, it will mean that we must have constantly in training 2,500,000 to 3,000,000 young people. We should not be satisfied until the agricultural vocational work has reached at least this number by providing systematic instruction and project experience under trained instructors for every young man and young woman who may desire to become a farm operator or a rural home maker.

The system of agricultural education is now quite complete. We have the Department of Agriculture, the agricultural colleges, and the experiment stations doing scientific investigational work. We have the colleges of agriculture training young men and young women in the science of agriculture. The agricultural vocational schools are providing systematic, organized training for the young men and women over 14 years of age who are not able to attend college. The Smith-Lever Act provides a system of practical instruction to men, women, boys and girls, through demonstrations, that is aimed to bring about an immediate improvement in agriculture and rural life. With such educational systems of instruction all working in close cooperation we should be able to build up a rural citizenship that will insure great National growth and prosperity.

Part VIII.

Agriculture in the Elementary Schools.

Agriculture in the Elementary Schools

During the past twenty-five years there has been a definite and widespread movement for the teaching of agriculture in the public elementary schools in the United States. The desire for this, as we have seen, was expressed at different times from the beginning of the movement for agricultural education in this country. And after the establishment of the agricultural colleges the National Grange in 1878 passed a resolution favoring such teaching. The public school system, especially in the rural districts, was not in condition to attempt this work at that time. Preparatory efforts to improve the curriculum of the elementary schools were, however, under way. Out of them came definite and feasible plans for elementary instruction in agriculture. These earlier movements may be grouped under the heads (1) Object teaching, (2) Nature-study and (3) School gardens.

Object Teaching

The basing of elementary instruction on objects rather than on books had been taught and exemplified by Pestalozzi and his followers. Joseph Neef had used this method in his private schools in this country from 1809 to 1825. The first definite object teaching in connection with a public school in the United States was at the State Normal School at Westfield, Mass. about 1845, under the influence of Horace Mann. It was taken up very actively at the Normal School in Oswego, New York, about 1860, by Dr. E. A. Sheldon and after 1875 was developed there in connection with the teaching of elementary science. William T. Harris introduced it in the St. Louis schools during his superintendency there between 1867 and 1880.

Great impetus was given to this movement through the wide publicity caused by the radical reorganization of the elementary instruction in the schools of Quincy, Mass. Charles Francis Adams was a member of the school committee of that town. Becoming greatly dissatisfied with the results of elementary instruction according to the conventional plan, he succeeded in bringing in Francis W. Parker as school superintendent. From 1876-1880 Colonel Parker based the elementary curriculum in the Quincy schools on object teaching. His great energy and enthusiasm inspired

the teachers under him. The pupils worked with a great variety of objects in and out of the school, did modeling in sand, visited the fields and woods to gather plants and other things, etc. The study of language, geography, etc. was correlated with the object study. After this Colonel Parker carried this method into the schools of Boston as a supervisor and in 1883 began a sixteen years term as principal of the Cook County (Chicago) Normal School in Illinois, whence his influence was widespread.

Object teaching did much to arouse the interest of pupils in the elementary grades but as pursued by the ordinary teacher was too much a disconnected study of a variety of objects and had comparatively little educational value.

Nature-study

Meanwhile the teaching of science was getting into the public school system and under the influence of Agassiz particularly was taking on certain phases of object teaching. Such teaching was done at first in the normal schools and high schools but before long efforts were made to adapt it to the simpler instruction required in the elementary schools. H. H. Straight, who had studied under Agassiz, became a teacher in the Oswego Normal School in 1876, where he developed a plan for more systematic object-teaching as elementary instruction in science and carried this over to the Cook County Normal School in 1883.

W. S. Jackman brought an improved plan for such work from Pittsburg, Pa. to the Cook County school ~~thixxxxxxxx~~ in 1889. He had children go out into the fields and woods and study natural objects and phenomena according to what they found there season by season. Beginning with 1890 he published "outlines in elementary science" in bi-monthly pamphlets and put them into book form in 1891. Meanwhile Arthur C. Boyden had been teaching similarly at the Normal School at Bridgewater, Mass. and in 1889 as a member of a committee of the Plymouth County Teachers Association made an outline for the study of trees which was sent to every school in the county and afterward was presented at teachers' institutes throughout the State. For several years exhibits

of the results of such instruction were made in cities. From 1889 to 1901 he taught on this plan at a summer school at Cottage City, Mass.

Frank Owen Payne independently began such work at Corry, Pa. in 1884 and lectured on this subject in Minnesota and New Jersey. About 1889 he used the term nature-study for such instruction and this soon came into general use to designate this elementary teaching. For a time teachers of science in higher schools thought their work should be called nature-study but with the specialization of science teaching this designation of the high school and college teaching of sciences disappeared. Nature-study has since been defined as "primarily the simple observational study of common natural objects and processes for the sake of personal acquaintance with the things which appeal to human interest directly and independently of relations to organized science."

Nature-study soon came into contact with the movement for the improvement of agriculture. At a conference on agricultural conditions in the State of New York in 1893 George T. Powell made a plea for interesting children in nature-study as a first step toward instructing them in agriculture. This resulted immediately in an experimental test of this plan in the schools of Westchester County. Frederick Nixon, chairman of the Ways and Means Committee of the New York Assembly met with the committee which had this matter in charge. In 1894 Mr. Nixon secured the passage as of a bill for the promotion of horticulture in Western New York suggested by John W. Spencer and L. H. Bailey, then professor of horticulture at Cornell University. (See p.694) The work under this extension act included promotion of nature-study in the schools by Bailey and others. In 1895 the Nixon Act was enlarged to cover the whole State. After the first year the general direction of the work under this act was given to Professor Bailey. He and his associates went out into the teachers' institutes and a large number of schools throughout the State, explained their work and publications and demonstrated to teachers how nature-study might be taught.

Mr. Spencer, as chief assistant in this work, called for nature-study leaflets in 1896 and afterwards originated the Junior Naturalists Clubs. The first leaflet, by Professor Bailey, was entitled "How a squash gets out of the soil" (336) and was intended for use by teachers. ^ The second was on "How a candle burns;" the third on "Four apple twigs"; the fifth on "Some tent-makers" (i. e., the apple-tree tent caterpillar); and the seventh on "Hints on making collections of insects."

In leaflet No. 6 Professor Bailey gave his conception of nature-study. "It takes the things at hand and endeavors to understand them, without reference to the systematic order or relationships of the objects. * * * It simply trains the eye and the mind to see and to comprehend the common things of life. * * * The proper objects of nature-study are the things which one oftenest meets. Today it is a stone; tomorrow it is a twig, a bird, an insect, a leaf, a flower." Moving things interest children most but it is often difficult to secure specimens and to see them in perfectly natural conditions. "Plants are more easily had, and are therefore more practicable for the purpose, although animals and minerals should by no means be excluded." "The only way to teach naturestudy is, with no course laid out, to bring in whatever object may be at hand and to set the pupils looking at it. The pupils do the work - they see the thing and explain its structure and its meaning."

The clubs were for the most part informal groups of children enrolled in the schools and led by their teachers to make observations of natural objects and phenomena in the region about them, read about these things and write letters to "Uncle John" (Spencer) about what they had seen and handled. Through these letters they were brought into touch with the agricultural college and sometimes stimulated to continue their school life further than they would otherwise have done. When desired the clubs were given a charter and provided with badges or buttons. The publications connected with this work were attractively printed and illustrated. Those for the children were quite simple. The clubs grew rapidly and within a few

years as many as 25,000 children in New York and to a limited extent in other States and a few foreign countries were enrolled in them.

Mrs. Mary Rogers Miller started the Home Nature-study Course with leaflets for teachers and Mrs. Anna Botsford Comstock succeeded her in this work in 1903. Mrs. Comstock's book of 938 pages, entitled Handbook of Nature-Study, was based on the leaflets issued up to 1911. ⁽³³²⁾ Promotion of nature-study with an agricultural trend was taken up by a number of the other land-grant colleges.

As the result of influences emanating from the sources mentioned and many others nature-study spread out widely within a ^{few} years but mainly in the city and village schools where there were teachers who had had some training in science. A considerable literature of the subject appeared. Among the books was one by L. H. Bailey, entitled The Nature-Study Idea, which was first published in 1903. The Nature-study Review was established in 1905 and the American Nature-Study Society in 1908.

Nature-study made a permanent impression on the elementary school curriculum and in various forms has been continued to the present time. Somewhat independently at first but later in close connection with nature-study the school garden movement was developed in this country.

The School Garden Movement

In the first half of the 19th century several German States introduced gardening into rural schools and somewhat later into city schools. Before the end of the century this movement had spread to other European countries. In Germany the garden at the village school was intended primarily for the teacher, as a source of vegetables and fruits for his table. But teachers interested in nature-study made it also a means of promoting that work. It furnished a field and materials for observations by the pupils and by their participation in the work of planting and caring for the garden they obtained useful practical knowledge and experience.

Such a garden at Alfter in the Rhine Province was visited by C. B. Smith and described by him in Circular 42 of the Office of Experiment Stations in 1899.

As early as 1856 General Armstrong, who afterwards founded Hampton Institute, introduced vegetable growing in some schools in Hawaii. This became a part of the school work in that Territory and in 1898 a department of nature-study and agriculture was organized in the normal school at Honolulu, with garden and field work.

In the report prepared by Mr. D. J. Crosby, of the Office of Experiment Stations for the American Park and Outdoor Art Association in 1903, two phases of this movement are described, (1) a somewhat restricted attempt to improve school grounds by planting trees, shrubs and flowers and (2) the more general planting of school gardens. (546) Beginning about 1900 improvement of school grounds was undertaken, sometimes with the aid of voluntary associations, in Rochester, N. Y., Cleveland, Ohio, Washington, D. C., Detroit, Mich., and other cities. In New York the Junior Naturalists Clubs were used to promote such work. A garden confined to native wild flowers and ferns was begun in connection with the George Putnam Grammar School in Boston, Mass., in 1891 and after ten years was used for growing vegetables. The Vineyard Street Grammar School in Providence, R. I. began the planting of ferns and violets in 1892. By 1903 school gardens were in use in a considerable number of places in Massachusetts, Connecticut, Maine, Rhode Island, Vermont, New York, New Jersey, District of Columbia, Virginia, Kentucky, Alabama, Ohio, Illinois, Indiana, Michigan, Minnesota, Nebraska, Missouri, California, Colorado, and Utah. A few examples will serve to show the general character of the work at that time.

At the school of horticulture at Hartford, Conn., there were 166 gardens apportioned as follows: For teachers, 24 gardens, each 10 by 30 feet; for boys and girls, 125 gardens, each 10 by 25 feet, for first-year pupils; 16 gardens, each 10 by 30 feet, for second-year pupils, and 1 garden, 10 by 40 feet, for a third-year pupil. The pupils were drawn largely from the city schools and had one hour a week in the gardens. The second-year pupils also had root grafting and greenhouse work,

including the preparation of soil, potting, repotting, and pricking out plants, and later were instructed in budding, spading, etc. Each city school was given six free scholarships. First-year pupils not receiving scholarships were charged \$5 tuition. The director of this school was H. D. Hemenway, a graduate of the Massachusetts Agricultural College and the author of "How to make school gardens" (1903).

In New York City Mrs. Henry Parsons, a member of the school board, secured permission in 1902 to fence an area 114 by 84 feet in DeWitt Clinton Park, at 52d Street and 11th Avenue, "for the purpose of giving some of the children in the vicinity useful and wholesome employment. The planting was not done until July, and the soil was very poor, the plow "having turned up rags, wire, lime, and stones," relics of a former dumping ground; but in spite of these drawbacks marked success attended the experiment. A tent was put up, which contained blackboards for instruction and seats for comfort, and later a flag pole was raised. The children came in squads of 25 each, wearing a tag numbered to correspond with the number of his 3 by 6 foot garden, and were given work not only in gardening but also in clearing ground of stones and in preparing it for planting. At first the children were given the choice of being farmers or policemen, and quite a good many thought they would like to be policemen, but after the third day the police force had all deserted to the farm. (546)

School gardening made a permanent impress on the public school system of New York City. In 1925 the School Garden Association of New York found 142 gardens in use by elementary schools in that city, 117 at the schools, 17 in city parks and 8 in vacant lots.

At Yonkers, N. Y., a school garden ~~was~~ maintained by the Women's Institute comprises $1\frac{1}{2}$ acres and is divided into 240 plats which are operated by as many boys, ranging from 9 to 13 years of age. This garden has been so popular that a waiting list is kept and when for any reason a boy drops out of the work there is no difficulty in filling his place. Each boy receives a ticket with his name and the number of his plat on it, together with a badge marked "School Garden." He pays 2 cents a week to the superintendent for "seed and instruction", but this of course does not begin to cover the cost of the seed alone. The principal object of this small payment is to give the boys a sense of proprietorship, and thus stimulate their interest. Each boy is required to attend to his plat at least twice a week, but the average visits have been more frequent. Each boy receives a memorandum book which has to be kept at the garden. Every time that he visits the garden he must make an entry in the book, which thus becomes a diary of his garden operations. A practical gardener is in charge, and he is assisted by a voluntary committee of several gardeners.

The city councils of Philadelphia appropriated \$3,500 in 1904 and again in 1905 for the maintenance of two public school gardens in the city. One of these was established in Weccacoe Square, Catherine Street below Fifth, on a vacant lot owned by the city, in the heart of a crowded foreign quarter. It contained 232 individual plats and 18 general plats. The children were selected from the seventh and eighth grades of 14 schools within walking distance of the garden. The other garden was located at Fifty-sixth street and Lansdowne avenue, in a semisuburban neighborhood, and contained 250 plats. About 400 children were taught in each garden. During the days when there were school hours the children worked in the gardens after school. During the summer vacation they had regularly appointed hours at different times of the day. When they had been taught to hoe, thin, transplant, etc., classes were formed, which received lessons in plant life after their work for the day. Vegetables and flowers were grown and materials were furnished for nature study and drawing in the public schools. (Office of Experiment Stations Report 1905, p. 356.) (564)

At the Hampton Institute in Virginia, the Whittier School for Negro children had two hundred plats, varying in size from 4 by 6 feet to 11 by 15 feet, devoted to this work. Each plat is worked by two pupils, and all of the work is done under the supervision of a man who is employed to take general charge of the gardens, plant the border beds, and keep the paths in order. Every child in the school, from the kindergarten to the seventh grade, is required to work in the gardens two recitation periods a week. When this work began nearly three years ago, not a few of the pupils thought it a disgrace to work out of doors, but at the present time there is not a pupil in the school who does not look forward with eagerness to the gardening periods. The work is conducted on pedagogical principles, and is so correlated with the other school exercises as to make it truly educational. It is also arranged in such a way that pupils finishing at the Whittier School are fully prepared to take up the agricultural work in the institute. (546)

At Cleveland, Ohio, the Home Gardening Association promoted gardening by children and adults and originated the method of encouraging the work by selling penny packages of seed. Lessons were given at the schools on the planting and care of the gardens. Exhibits were held in the autumn with prizes of money or bulbs. The money was devoted to improving school grounds. In 1905 a curator of school gardens was appointed to have charge of the planting and improvement of school gardens throughout the city. The work at Cleveland continued to grow and in 1908 there were gardens for defective and delinquent children as well as for normal children. A kitchen garden was also maintained in connection with a cooking school.

While this work is carried on in connection with the schools and is supported by the school fund, it is not yet a part of the school curriculum, being entirely voluntary on the part of the children and done outside of school hours. All of the garden work in connection with the schools is under the immediate direction of the superintendent of gardens, who in turn is responsible to the curator of school gardens and school grounds.

The Home Gardening Association continues to lay emphasis upon the encouragement of gardening at home among the poor classes and the improvement of home grounds, but for two years it has also conducted what is known as the training garden, where some of the larger boys and girls who have gained some experience in gardening in connection with school gardens or isolated home gardens, and who show an aptitude and a desire for this kind of work are given an opportunity to cultivate larger gardens and to learn the use of the wheel-hoe, drill, and other tools used in commercial gardening.

The training garden includes an area of about $3\frac{1}{2}$ acres, which is divided into narrow plats extending the length of the field, and thus gives excellent opportunity for cultivating vegetables in long rows according to improved modern methods. One feature of the training garden is a model garden. 60 by 100 feet, planted entirely to the 24 kinds of seeds which the Home Gardening Association puts up in penny packets to sell to children. This garden is thus a demonstration of what can be done with 24 cents' worth of seeds. (Office of Experiment Stations Report 1908, p. 288.) (564)

In Winnebago County, Illinois, through the influence of the Superintendent of Schools, Mr. O. J. Kern, school gardens had been started in about 15 districts.

In St. Louis, Missouri, a junior school of horticulture was begun under the direction of the Civic Improvement League.

Five acres were used in 1904, 150 children reporting in sections of 20 once a week, availing themselves of this opportunity. Five plats 5 by 10 feet and one plat three times as large, for corn, were assigned to each child. Instead of rows of various kinds of vegetables and flowers, as in most children's gardens, but one kind of vegetable was planted in a plat. The corn plats were kept together in one part of the tract. Prizes were awarded at the end of the season to the boys with the highest records for punctuality, attendance, good work, and deportment. (Office of Experiment Stations Bulletin 160, p. 33.) (556)

In New York State the members of the Junior Naturalists Clubs had been encouraged to grow plants at their homes from the beginning of their work.

A number of normal schools had undertaken garden work. The Boston Normal School used a vacant city lot.

At this place boys from the Rice Training School and girls from the Franklin School had individual gardens under the supervision of a science teachers in the normal school, who was assisted by her normal students. This work has succeeded admirably, not only in furnishing garden work for the pupils of these two schools, but also in providing training for prospective teachers. This year three graduates of the normal school have been put in charge of school-garden work in seven of the other city schools, and a fourth graduate has charge of gardens in connection with several of the schools at Brookline.

At least two of the normal schools of Massachusetts, viz., those at Hyannis and Framingham, have incorporated school-garden work in their practice schools to give their normal students training in conducting work of this kind. At Hyannis the garden work is made the basis for numerous exercises in connection with the mathematics, bookkeeping, business training, drawing, and language work of the school. The children write letters to the seedsmen from whom they purchase seeds, sell their produce, deposit money in the bank, make purchases and pay for them with checks drawn on their account.

In Vermont the State Normal School at Johnson maintains a half-acre experimental school garden in connection with the training school. A portion of the garden is devoted to cooperative flower and vegetable growing by the pupils in the lower grades, the remainder to a potato crop in charge of grammar-grade pupils, each of whom has "one long row to hoe." The work includes instruction on the use and effect of fertilizers. The Experiment Station at Burlington cooperates with the normal school, furnishing "some of the materials and much good advice." (546)

Normal schools at Los Angeles, Cal., and Salt Lake City, Utah, had made garden work a feature of their practice school for several years.

Instruction to the school children of Washington, D. C., in growing flowers and vegetables began in the normal school about 1901 through the cooperation of the Department of Agriculture and the instructor in botany in the normal school. The first year nothing was attempted except home gardening on the part of the normal school students; but this experiment was so successful that plans were made for broadening the work. The Department turned over to the use of the instructor in botany and her normal school students a small greenhouse and a workroom, where the students met once a week and received instruction as well as practical experience in examining and handling soils, germinating seeds, planting, potting, transplanting, making cuttings, and grafting. When spring came each of the 97 normal school students was required to start a home garden in which she might be able to carry out the instruction and experience of the class room and workroom. Connected with the normal school are 12 practice schools, containing about 450 children, who have been given seeds for home planting and are under the instruction of the normal students. In this way the children are receiving valuable instruction in plant growth and the future teachers of Washington are being trained to carry on the work in an intelligent and practical way.

In addition to this work the Department of Agriculture has placed at the disposal of the normal school a strip of land 10 by 250 feet, which is being cultivated by a class of 30 boys and girls from a sixth-grade school in the vicinity of the Department grounds. Each plat is 7 by 10 feet and contains the common garden vegetables and a few flowers. The success of the experiment has been remarkable, not only in the general good condition of the gardens, but in the marked enthusiasm shown by the children for their work. It is all volunteer work, and yet many of the pupils spend time during recess periods and after school at work in their gardens.

The influence of this work in connection with the normal school is extending to other quarters of the city. Through the cooperation of the Department of Agriculture, the National Plant, Flower, and Fruit Guild, and the social settlements in the city, gardens containing from 10 to 35 plats each have been started in several different localities. The places were selected by an officer of the guild, the children to carry on the work were secured through the social settlements, and seed was furnished by the Department, which also sent out a gardener to superintend the planting and now furnishes volunteers to oversee the work. Through these influences also a great many gardens have been or are being planted in the vicinity of the various garden centers. (546)

In 1905 the work in Washington and a number of other cities was described in Bulletin 160 of the Office of Experiment Stations, by B. T. Galloway and Miss Susan B. Sipe, and a Farmers' Bulletin on the school garden, by Prof. L. C. Corbett, horticulturist of the Bureau of Plant Industry, was published.

In 1906 the Bureau of Plant Industry reported that it had distributed 377,540 packets of vegetable and flower seeds to every State and Territory, except Nevada and Wyoming. "It can safely be said that more than a thousand teachers of schools in various parts of the country are interested in this work."

In 1908 the Office of Experiment Stations reported that school gardens had not been generally successful in connection with rural schools, except where combined with homegardens and boys' or girls' clubs.

The school garden movement continued to grow and to get a larger measure of public support. At the San Francisco meeting of the National Education Association in 1911 the School Garden Association of America was organized, with V. E. Kilpatrick of New York as president and D. J. Crosby of the Office of Experiment Stations as secretary. A joint meeting of this new organization with the American Nature-study Society and the department of rural and agricultural education of the parent society was held, thus emphasizing the union of the forces in an effort to improve the curriculum of the elementary schools. At this meeting Prof. C. S. Stebbins of the department of agricultural education of the University of California took the position that "the first aim of the school garden is to build citizenship and at the same time to create a sympathy for farming life." (95)

This association continued to promote gardening in connection with the schools until after the World War when its place was taken by the Council of Nature-study and school gardening, which meets annually in connection with the winter meeting of the Department of Superintendence of the National Education Association.

Experience showed that only the children in the first few grades were interested in the growing of plants in the little plats usually found in the school gardens. After that a community garden or home garden served to prolong the interest but these were difficult for the schools to manage without special provisions for supervision of the outside work. The development of the boys' and girls' clubs as a part of the agricultural extension system under the Smith-Lever Act drew the attention of the rural schools away from the school gardens, in which they had never been largely interested.

On the other hand the smaller cities in large numbers took up this work. In 1915 the Bureau of Education considered the garden movement of sufficient importance to warrant the establishment of a division of school and home gardening and this was put in charge of Mr. J. L. Randall. Reports were received in 1916 from 1,220 city superintendents who were encouraging some form of school-directed gardening. The public appropriations for this work in 20 cities ranged from \$1,000 to \$19,893, in 12 cities from \$500 to \$1,000, and in 108 cities were in amounts less than \$500. Many other agencies were promoting the work and 220 cities had funds from private sources.

Home garden work through the schools, particularly in the cities, was greatly stimulated during the World War when there was wide-spread and increasing interest in supplementing the ordinary production of food by resorting to unusual means. To aid this enterprise the Bureau of Education secured from President Wilson's "National Security and Defence Fund" in 1918 \$50,000, to which \$200,000 was afterwards added. This money was used to organize the United States School Garden Army, with Dr. J. H. Francis as director. This army had officers with military titles and the members received badges. The country was divided into 5 districts with Federal supervisors. Leaflets and other publications describing and stimulating the work were published and widely distributed. The Bureau reported that on July 10, 1918, 1,500,000 boys and girls were enrolled in this army. This undoubtedly included many children who had already been organized for similar work by the extension agents of the Department of Agriculture and the State agricultural colleges and other agencies. Failure to

carry on this new enterprise with the proper cooperative spirit led to its collapse at the close of the war and the Bureau failed to get further appropriations for school garden work. The reaction which occurred after the abnormal pressure for war work ceased greatly diminished the strength of the school garden movement throughout the country. It then became largely a matter of local interest as fostered by agencies outside the school or by individual superintendents or teachers. It was more closely identified with nature-study as carried on in the lower grades and there was a fuller realization that it had a cultural rather than even a prevocational value. The interest aroused among educators in nature-study and school gardening and the results of experience and investigation with reference to the educational and practical problems involved in such work had important effects on the movement for the more definite teaching of agriculture in the elementary schools.

Elementary Instruction in Agriculture

The great awakening of public interest in the teaching of agriculture in the colleges which occurred about 1900 led to an active demand that this subject should be taught in the elementary, as well as in the secondary schools. Teachers here and there, particularly in schools where the grades were combined with the higher departments, undertook the teaching of agriculture to the younger children. In this effort there were many failures but some notable successes. The farming people, especially as represented by their organizations, without realizing the great difficulties attending the general introduction of a subject like agriculture into the rural schools, moved the legislatures to pass laws permitting or requiring the teaching of agriculture in the rural or all the elementary schools of the State. The spread of the nature-study and school-garden movements intensified the desire of the country people and the other friends of rural education to have instruction more definitely related to agriculture in the rural elementary schools which were the only educational institutions attended by the great mass of farm boys.

About the same time the consolidation of rural schools became a matter of widespread discussion and the laws permitting such consolidation, which had been passed in the New England States, New York, Pennsylvania and Ohio, began to have a decided effect. Successful consolidation of a number of schools in these States soon led to a similar movement in New Jersey, Iowa, Minnesota, Michigan, Nebraska and Wisconsin. Obviously there was a better chance for the successful teaching of agriculture in such schools and examples of this soon began to appear.

Some normal schools began to teach agriculture and some agricultural colleges made special provisions for instructing teachers in short courses or summer schools.

The movement for the teaching of agriculture in the elementary schools attracted the attention of the Association of Agricultural Colleges and at its meeting at Washington in 1903 it was suggested that its committee on instruction in agriculture make a report on this matter. This was done in 1904, when a report was presented on "The teaching of agriculture in the rural common schools."

The committee found that nature-study having an agricultural trend was about all that had been attempted in the way of teaching agriculture in the rural schools until quite recently.

Within the past two or three years, however, State superintendents of public instruction, the officers of some of the agricultural colleges, the National Educational Association, the American Civic Association, as well as a number of other organizations and numerous individuals in various official positions have interested themselves in the introduction of elementary agriculture and gardening in the rural schools.

Some of the State school authorities, officers in agricultural colleges, and county superintendents of schools have prepared outlined courses in agriculture which have exerted a strong influence toward the teaching of agriculture in the rural schools. Such courses have been prepared, for example, in Missouri, Illinois, and Indiana, and for a group of schools under one superintendent in Durham, N. H. and vicinity.

The Illinois course in agriculture was prepared by the dean of the college of agriculture, and gives the following reasons for teaching agriculture in the public schools:

- "(1) To cultivate an interest in and instill a love and respect for land and the occupation of agriculture.
- (2) To create a regard for industry in general and an appreciation of the material side of the affairs of a highly civilized people.

- (3) To cultivate the active and creative instincts as distinct from the reflective and receptive that are otherwise almost exclusively exercised in our schools.
- (4) To give practice in failure and success, thus putting to the test early in life the ability to do a definite thing.
- (5) To train the student in ways and methods of acquiring information for himself and incidentally to acquaint him with the manner in which information is originally acquired and the world's stock of knowledge has been accumulated.
- (6) To connect the school with real life, and make the value and need of schooling the more apparent.
- (7) As an avenue of communication between the pupil and the teacher, it being a field in which the pupil will likely have a larger bulk of information than the teacher, but in which the training of the teacher can help to more exact knowledge.

The course is arranged by months, and gives suggestions for a larger number of experiments and observations bearing on all the divisions of agriculture. Considerable reading along agricultural lines is suggested, as well as drawing, composition, and other work intended to correlate agriculture with other school work. All technical words likely to be used frequently in this connection are defined.

After a year it was reported that nearly all the schools in 14 counties and a majority of the schools in 15 other counties were teaching agriculture.

In Missouri the course in agriculture for the public schools was prepared several years ago by the State superintendent of schools. This course has been superseded by a bulletin prepared by the State superintendent of schools and published by the Missouri State Board of Agriculture in September of the present year, entitled "Elements of Agriculture for the Public Schools." This bulletin advocates presenting the subject of agriculture "(1) by experiments at home and in the field, (2) by studying facts as given in texts and bulletins, and (3) by school gardens connected with school grounds."

The State superintendent of public instruction of Indiana, in his State Manual and Uniform Course of Study for the Elementary Schools of Indiana, 1904-5, includes a nature-study course intended "to acquaint the pupil with his environment and to train him to see and understand the relationship and meaning of common things," and a course in elementary agriculture. The subjects suggested for consideration in the nature course are largely the plant and animal life of the farm and the garden. The course in agriculture is simply an outline intended to guide the teacher, taking up for first consideration plant and animal products: then the soil, its formation, nature, tillage, and enrichment; and, finally, plant life. References are given to a number of bulletins and elementary text-books of agriculture.

The department of agriculture of the University of Minnesota has been actively engaged in promoting the teaching of agriculture in the rural schools, and its officers have prepared a bulletin on Rural School Agriculture for the use of the teachers in that State. In Wisconsin the State superintendent of the public schools and the officers of the College of Agriculture of the University of Wisconsin have done much for the introduction of agricultural teaching in the country. One of the results of their efforts has been the enactment of a law requiring teachers to pass examinations in agriculture. Similar laws have also been enacted in Maine, Nebraska, North Carolina, South Carolina, and Tennessee. * * *

The College of Agriculture of Cornell University now provides a two-year normal course in nature study and gardening. In Michigan ten county normal training schools have recently been opened for the purpose of training teachers for the rural schools.

The course of study recommended for these normal schools by the State superintendent of public instruction includes agriculture. The agricultural colleges in Connecticut, Nebraska, and North Carolina have for a number of years conducted summer schools for teachers, at which more or less attention has been given to nature study and agriculture.

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One thing that has given a great impetus to the movement for the introduction of agriculture into the public schools has been the improvement of text-books and works of reference. Within the last year or two a number of elementary text-books in agriculture have been published, and some of these seem very well suited to use in the rural schools. One of the indirect results of the appearance of these text-books has been legislation in a number of States requiring the teaching of agriculture in all the rural schools, and adopting text-books for that purpose. State adoption of text-books in agriculture has been made in Alabama, Georgia, Louisiana, North Carolina, and Tennessee. Every city and county in Virginia, a majority of the counties in Maryland, about 15 counties in California, and a number of counties in Florida have also adopted text-books in agriculture for regular use in the public schools. It is estimated from teachers' reports that at least 12,000 children received instruction in agriculture in North Carolina last year. (708)

The obstacles to the general introduction of agriculture into the rural schools were pointed out by the committee. These included the conservatism or apathy of State, county and local school officers and of members of agricultural college faculties in many States; lack of trained and experienced teachers; and shortness of school terms. Consolidation of schools will help but special effort must be made to provide competent teachers.

Nature-study "of plants, animals, soils, weather conditions and other natural objects and phenomena, in their relation to each other and to man, will give the pupils an excellent preparation to take up at the beginning of their sixth or seventh year in school the more formal study of agriculture."

The course in elementary agriculture may be given most appropriately during the last two years in the rural common school. The time to be devoted to this course will necessarily vary in different schools, but it is believed that on the average not less than one hour per week during two years will be required to make the course effective. A well-arranged and up-to-date text-book, with illustrations and suggestions for practical exercises, should be adopted as a basis for this study. A few such books already exist, and an increased demand would undoubtedly lead to the production of others and the still further improvement of books of this class. The text-book will in most cases be necessary as a more or less definite guide for the teacher, who will in all probability be without special training in agriculture. It will also be helpful to the pupils in giving a systematic view and in fixing definite knowledge of the subject, and to the parents in showing them what such instruction really involves and in creating an interest in the subject-matter of the books.

The instruction in the class room should be supplemented by simple experiments with soils, plants, and animals both at school and at home. Every effort should be made to connect the instruction with the home life of the pupils. As an aid to the accomplishment of this aim the pupils should be taken on occasional Saturday excursions to neighboring farms to see improved live stock, examine plans of buildings, and take notes on methods of cropping and cultivating. Visits to county fairs, where arrangements could be made to allow the older pupils to judge some of the live stock, fruits, and grain, and compare their scores with the work of the judges, would be fine training for the classes in agriculture. This scheme has been tried with older students of agriculture and has met with thorough approval. The officers of the fairs could probably be induced to offer prizes for products grown by the pupils and for other agricultural work done by them; or special exhibits of their work could be made at farmers' institutes or other meetings attended by their parents.

All these things would tend to create an interest in farm life, and would encourage parents to make the farm more attractive to the children.

The schoolrooms should be provided with illustrative material consisting of charts, pictures, collections of specimens (largely made by the pupils), and boxes, cans, plates, and other inexpensive material which can be used in making apparatus for conducting experiments. There should also be a school library containing at least a few standard reference books on the different divisions of agriculture and the publications of the State experiment stations and the United States Department of Agriculture. (708)

The committee then presented a syllabus of an elementary course in agriculture, which included the plant and its environment, farm crops, fruits, types and breeds of domestic animals and their care and management, the dairy cow, composition, handling and uses of milk, farm plans and structures, farm machinery, marketing and farm accounts.

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This report followed up through the Office of Experiment Stations by the preparation by A. C. True and D. J. Crosby in 1905 of a suggestive course of nature-study and elementary agriculture for the schools of California. (Office of Experiment Stations Report 1906, p. 281.) This was done at the request of a committee appointed at a meeting of the State Teachers Association with the State Farmers' Institute. The following is a synopsis of this course, arranged for three groups of children:

Group	Character of instruction	Garden
I. Nature study, Children 6 to 8 years old.	Observation: Observe wild and cultivated plants, trees, insects, and wild and domestic animals in environment at home and near school.	School garden: Plant and grow some of the common hardy vegetables, such as radishes, lettuce, beets, and carrots; and one or two quick-growing flowers, such as dwarf nasturtiums.
II. Nature study, Children 9 to 11 years old.	Observation and Comparison: Observe weather, soils, wild and cultivated plants, trees, insects, and wild and domestic animals in environment of school district and vicinity; compare habits of plants and animals in order to become familiar with their different modes of living, their struggles for existence, and their uses to man.	School and home gardens: Plant and grow typical economic plants of the region, giving some attention to different varieties, and to the relation of crops to different conditions of soil, weather, treatment, etc.
III. Agriculture. Children 12 to 14 years old.	Observation, Comparison, and Judgment: Study objects as above, within and beyond horizon of children's observation; introduce text-books and reference books on elementary agriculture as sources of information concerning objects beyond the limits of personal observation; illustrate processes by simple experiments; study different types of plants and animals; visit typical farms; teach sources and uses of agricultural literature - books, bulletins, and farm journals.	School and home gardens: Plant and grow different varieties of crops - e. g., wheat, barley, sugar beets, potatoes; introduce exercises in pruning, grafting, making cuttings, encourage pupils to grow crops, poultry, and farm animals at home, keeping account of labor, fertilizers, feed, gross and net returns, and have them experiment on different methods of planting, cultivating, harvesting, and preparing for market.

Pupils in Group III (grades 7 and 8) should continue to study and compare weather conditions, soils, plants, animals, and other natural phenomena and objects both within and beyond the limits of their personal observation. As sources of information concerning things not coming under their immediate observation or experience, the pupils should use a well arranged up-to-date text-book of agriculture and have access to good works of reference.

The oral work of the class room should be supplemented in many ways. Agriculture is a subject which lends itself admirably to the laboratory method of teaching. It is rich in illustrative material, and more than almost any other subject of study, it may be made to draw upon and utilize the resources of the whole community for the material. There should be laboratory work at school, garden work at school and at home, and study of farm animals, irrigation and drainage systems, home water supply and sewage systems, buildings and fences, orchards and spraying machinery, rotations and other systems of cropping on the better farms of the district. Pupils should be taken to local dairies to study dairy animals and machinery, to creameries, cheese factories, and canneries to study methods of preparing farm products for consumption and shipment, to cold-storage plants to study the preservation of foodstuffs, to the butcher shop to study meat cutting, to the green grocer to learn methods of preparing fruit and farm products for market, and to the implement dealer to compare types of farm machinery. Clubs of boys should be organized for the discussion of agricultural topics and to give practice in parliamentary proceedings. School and county fairs have been found very efficacious in stimulating interest among children along agricultural lines. In some States the county and State fair associations have aided the movement for agricultural education by offering liberal prizes for the best displays of agricultural products grown by school children.

The time to be devoted to agriculture will necessarily vary in different schools, but it is believed that on the average not less than one hour a week during the seventh and eighth years will be required to make the class work and laboratory experiments effective. (564)

Suggestions for simple practicums were given, and illustrated by examples prepared by the agricultural colleges in Indiana, Ohio and Washington. A list of six text-books of elementary agriculture was also given, together with a considerable number of books and bulletins for reference. Attention was called to Mr. Crosby's article on the use of illustrative material in teaching agriculture in rural schools, in the Yearbook for 1905 of the United States Department of Agriculture and to Bulletin 186 of the Office of Experiment Stations on Exercises in elementary agriculture.

In 1905 the committee of five made a report to the National Education Association in which they recommended that agriculture be taught in the last three years of the common school but that the teachers of the one-room rural school should not be positively required to do this because generally they are not prepared to

913
teach this subject and the school term is often too short to permit an additional study.

By this time laws permitting or encouraging the teaching of agriculture in the rural schools had been passed in Alabama, Florida, Georgia, Illinois, Louisiana, Maryland, Michigan, Missouri, North Carolina and Wisconsin. Within the next five years 13 States had passed mandatory laws on this subject. It was encouraged by State and county school officers and taught in some of the rural schools of 31 other States and Territories. In 1915 the teaching of agriculture in public rural elementary schools was required in 22 States.

Textbooks of Elementary Agriculture

Soon after 1900 a new type of textbooks of elementary agriculture began to be published. These combined statements of facts about the plants, animals, implements, etc. used in farming and horticulture with simple explanations of principles underlying the practice of agriculture and the results of experiments relating to agriculture. An early book of this type, first issued in 1903, was entitled "Agriculture for beginners", by C. W. Burkett, F. L. Stevens and D. H. Hill, professors of agriculture, biology and English in the North Carolina College of Agriculture and Mechanic Arts. (24) The subject was treated in logical order but teachers were asked to "feel free to teach each topic in the season best suited to its study." Many definite suggestions for observations and simple experiments were made. "Lead the pupils out into the field, make simple experiments before them, and have them also perform experiments. Let them learn directly from nature. * * * In many cases it will be best to perform the experimental or observational work first, and turn to the text later to amplify the pupil's knowledge." The book was attractively printed and had over 200 illustrations.

Without doubt the publication of such textbooks greatly promoted the definite teaching of agriculture in the rural schools. As a rule the teachers in these schools had neither the training nor the time to prepare lessons and practicums

themselves but could often use the books and follow some of the practical suggestions made in them. There was, of course, the inevitable tendency for many teachers simply to hear recitations based on the text and this has been largely the kind of instruction in agriculture given in rural schools up to the present time. Some of the States adopted a particular textbook of agriculture for use in all the elementary schools attempting to teach this subject.

While the movement for the teaching of agriculture in the rural elementary schools continued to grow and there was an increasing number of instances where this was done successfully, particularly in the consolidated schools, it was soon apparent that provision must be made for more informal instruction suited to the actual conditions in most rural schools. In 1909 the Office of Experiment Stations reported that such instruction through boys' and girls' clubs, judging contests, excursions and boys' encampments was rapidly extending in all parts of the country.

Boys' and Girls' Clubs

The boys' agricultural clubs grew out of an attempt to arouse interest in farmers' institutes in Macoupin County, Illinois. When the adult farmers did not respond to special efforts to get them to attend institutes, Mr. W. B. Otwell, as president of the County Institute distributed carefully selected corn to 500 boys, who grew it and made an exhibit for prizes at the next institute in 1900. This was so successful that the next year 1,500 farmer boys entered the contest. There was then no difficulty in getting a large attendance of boys and adults at the county institute. When Mr. Otwell was put in charge of the Illinois agricultural exhibit at the St. Louis Exposition in 1904 he got 8,000 boys in the State to grow corn for prizes and 1,250 exhibits of their work received awards there. This kind of work was taken up more or less directly under the auspices of the State College of Agriculture, the Illinois Farmers' Institute and the county institute secretaries and county superintendents of schools in a number of counties in Illinois. In February, 1902, Superintendent O. J. Kern, who was actively promoting the improvement of the

rural schools in Winnebago County, organized a "Farmer boys' experiment club", in cooperation with the agricultural college. Seeds of sugar beets were furnished by the college and of corn by the State Farmers' Institute. The club began with 37 members and in November 1903 there were 405. Excursions were made to the colleges in Illinois, Iowa and Wisconsin by the boys and their parents. The boys tested the seed, made observations on the growth of the plants, determined the percentage of smut in fields of oats, etc. Meetings of the club were held at various farms, a half-day was given them at the county farmers' institute and monthly lectures by college officers and others were provided at the county seat during the fall and winter. Similar clubs were organized in a number of other counties in Illinois and in 1904 the State superintendent of farmers' institutes estimated that not less than 2,000 boys were in the clubs in that State. Local clubs were formed, usually by townships, and united in a county association.

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Boys' clubs were first organized in Ohio, by A. B. Graham, superintendent of schools in Springfield township. Similar clubs were soon formed in other parts of the State. In 1905 when Mr. Graham was put in charge of the agricultural extension work of Ohio State University, there were 3,000 members of such clubs in the rural schools. About this time clubs were organized in Texas in connection with the Texas Farmers' Congress. In Iowa the first club was organized in 1904 at Sigourney, Keokuk County, by the County Superintendent of Schools. As a special feature of the 147 school districts in Keokuk County held a school fair in the fall of 1904, where the boys exhibited the fruits, vegetables and farm crops which they had grown. The best and second best articles of each class were then shown at the 16 township fairs and the three prize articles of the several kinds from each township fair were exhibited at a county school fair. This county fair exhibit contained more than 3,000 articles. In connection with each fair there was a program of talks, papers, recitations, and music. At the county fair there were a corn-judging school, a debate and a composition contest. A small admission fee at the fairs paid all expenses.

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In 1907 clubs began to be organized in connection with the farmers' cooperative demonstration work in the Southern States under Dr. Seaman A. Knapp. The clubs were formed on the basis of each boy's growing an acre of corn or other crop. In 1909 there were more than 10,000 boys enrolled in the competitive corn contests and in 1910 over 46,000 boys were connected with the clubs. These clubs spread rapidly and ultimately became a prominent feature of the cooperative extension work under the Smith-Lever Act. School teachers and officers in many places cooperated from the beginning in the organization and work of these clubs.

Clubs for girls paralleled those for boys under various auspices. The girls dealt with gardening, canning and household arts. In 1909 the Office of Experiment Stations reported that club work for boys and girls was organized in at least 395 counties in 29 States, with a membership of more than 150,000.

About 1905 the State Superintendent of public schools in Wisconsin issued a manual for the common schools of that State which contained an outline course in elementary agriculture and a similar course for the schools of South Dakota was published. The New York State Education Department issued a course of study and syllabus for elementary schools which contained an outline for nature-study in the first six years of the elementary course and agriculture in the remaining two years. This was further elaborated in 1909 when it was presented as the study of birds, animals and plants. The nature-study and agricultural features were combined throughout this course. Much of the course was based on the study of the hen, the cow and the pea as interesting living things in nature and as having agricultural value.

In Massachusetts a committee of five appointed by the conference on agricultural science at the Massachusetts Agricultural College in 1908 prepared and the agricultural college published a course in elementary agriculture which consisted of a series of practical exercises, for each of which appropriate materials and directions were suggested. There were 54 of these exercises, covering such topics as types of soil and subsoil, plant roots and root nodules, effect of humus and lime in clay soil, determination of the percentage of water and air in soils, testing soil solutions for acidity or alkalinity, soil temperatures, capillarity and evaporation, soil drainage, transpiration in plants, study of various seeds, corn germination, variations in plant growth, improvement by selection, home gardening, grafting, pruning, and budding, plant enemies and diseases, preparation of Bordeaux mixture, (564) milk testing, and milk bacteria. (Office of Experiment Stations Report 1910, p. 383.)

Along with the movement for the teaching of agriculture in public elementary schools there was similar teaching in special or private schools. Among the early schools of this kind were the Thompson's Island Farm School, near Boston, the Baron de Hirsch Agricultural and Industrial School at Woodbine, N. J., the School of Horticulture at Hartford, Conn., the School of the Youths' Directory of San Francisco at Rutherford, Cal., and schools for negroes at Hampton, Va., Tuskegee, Ala., Atlanta, Ga., Manassas, Va., Enfield, N. C. and elsewhere.

In 1919 the State Superintendent of public instruction in Missouri undertook to meet the difficulty arising from the great variety of work which the rural teacher has to do in the school by trying a rotation plan of teaching elementary agriculture. He selected 15 counties for this experiment. Among them was Nodaway County, where this plan was quite successful. The work was for boys and girls and included not only subjects directly pertaining to farming but also those relating to the life and welfare of children and adults, such as health, sanitation, home conveniences, social conditions and community interests. The course covered four years and was scheduled as follows:

First year. Teach growing things. Farm crops; how seeds grow; depth to plant; corn; oats; alfalfa; weeds; gardens; canning; drying.

Second year. Making things. Making nail box, wash bench, book rack, etc.; rope knots; splicing rope; cement tanks, steps, and posts; farm tools and machines; removing stains; sewing.

Third year. Live things. Animals; diseases and remedies; how to feed; testing milk; poultry; useful birds; insect pests; setting the table; hot lunch.

Fourth year. Soil and home. Soil fertility; cultivation; moisture; sanitation; beautifying the home; social and community work. (597)

Each year there was in each school only one agricultural class made up of children in grades 5 to 8. The county superintendent reported on the working of this plan as follows:

When the four years' work is finished we will start in again with the first year's work. By this time the older pupils will have graduated and the work will be new again to both teacher and pupils. This plan makes it possible for us to give the pupils more agriculture; keeps the work live and real and vital; and makes it easier for us to supervise the work. It is relatively easy for us to train our teachers for one line of agricultural work each year, while it would be impossible for us to train them for all lines of work. (597)

Before beginning the work the county superintendent and the teachers had a week of intensive training under expert direction. While the instruction in the school was in progress the county superintendent held weekly conferences with the teachers, at which they did the things the children were expected to do. This plan was so far successful that it soon spread into parts of Oklahoma, South Dakota and Nebraska. It has, however, been more usual for the State courses in elementary agriculture to be arranged for the seventh and eighth grades, alternating by years.

Another plan "to vitalize teaching in rural schools is to provide pupils' survey outlines upon selected topics, such as poultry, cattle, corn or roads."

Under the direction of the teacher pupils gather the data, assemble them, and utilize the findings in innumerable ways in the various school subjects. The successful operation of school agricultural surveys has intensified interest in school work and aroused whole communities into active cooperation for school and community betterment. (597)

In an analytic survey of State courses of study for rural elementary schools by Prof. C. M. Reinoehl of the University of Arkansas, made in 1922 and published by the Bureau of Education, it appeared that all the States except California, Florida, Arkansas and Rhode Island had issued such courses. The 35 State publications containing the most complete and detailed outlines were used in this survey. Agriculture has been given a prominent place in these State courses.

The materials have to do with plant culture (47 per cent), animal husbandry (20 per cent), farm management and improvement (27 per cent), and plans and methods of teaching (6 per cent). Facts about farm work are emphasized.

The most common method of teaching agriculture is the textbook method. Teachers have been encouraged in the use of this method by the type of outlines in some States. There are few method topics. The project and the problem methods are coming into use. (609)

The development of the home project in connection with the secondary schools and the extension clubs has had an increasing influence on the teaching of agriculture in the elementary grades, particularly in the consolidated schools. Many of the children from 12 to 15 years old have been in the clubs and thus have been encouraged to study agriculture in the school as an aid to their club work. The

development of the vocational instruction in agriculture under the Smith-Hughes Act has also stimulated more interest in the elementary instruction on the part of school officers and teachers. The Federal and State officers in charge of the Smith-Hughes work are increasingly impressed with the desirability of encouraging the elementary instruction on a prevocational basis.

The Division of Agricultural Instruction, in the Office of Experiment Stations and later in the States Relations Service, ~~has~~ aided the movement for the introduction of agriculture into the elementary schools in various ways. In cooperation with the State agricultural colleges and State departments of education it prepared outline courses of agriculture for elementary schools in Maryland, Ohio, North Carolina, and Arkansas. Lessons on corn, potatoes, dairying and gardening were also issued. Leaflets were prepared showing how teachers could use the Farmers' Bulletins in their school work. Classified lists of department publications and suggestions for illustrative material, and sets of lantern slides on agricultural subjects have been distributed.

The recent status of elementary agriculture in the rural schools of the United States has been shown in the report of a committee, of which Dr. E. H. Shinn, Chief of this division, was chairman, presented to the American Association for the Advancement of Agricultural Teaching on November 12, 1923. This report was based on replies to a questionnaire from State superintendents of education, supervisors of rural schools, presidents of State normal schools, State supervisors of agricultural education, and heads of teacher-training divisions in the land-grant colleges. The findings of the committee are summarized as follows:

(1) On the basis of the returns it appears that about 28 of the States require by legislative acts that elementary agriculture be taught in the rural schools. A few other States have special rural aid laws, etc., looking to the betterment of rural schools. Very little definite information is given in regard to specific legislation which has functioned best to procure for rural schools, a type of education adapted to rural needs, the replies dealing more in general than in specific terms.

(2) Thirty-five of the 48 states report that the state departments of education are sympathetic and are encouraging better rural school education while a few replies say that nothing particular is being done in this direction. Examples of well organized programs on the part of state departments of education for improving agriculture and nature study in rural schools are rare. However, some splendid work in this direction is being done in several states and there are visible signs of progress in a number of other states.

(3) In about two-thirds of the states the returns show that courses are offered in elementary agriculture for rural teachers. The other replies say that very little or no teacher-training work is offered. A number of returns say that there is no demand for training of this kind. As a rule the courses are offered in normal schools or teachers colleges, high schools, and special agricultural schools.

(4) Returns from only 20 states indicate that the teaching of agriculture and nature study in rural schools has been effective. Practically all the other returns say the work has been ineffective.

(5) The type of school in which the work has functioned best, according to the returns, is the consolidated rural school. A few returns say that the work has functioned best in no particular type of school, that it is the teacher rather than the school that counts most.

(6) Returns from more than half of the states say that agriculture and nature study when properly taught have vitalized other school subjects. Some quite specific examples are cited to substantiate this fact.

(7) In reference to problems and difficulties, about five-sixths of the returns say that lack of competent teachers for the work is the great problem. Some suggest better supervision, rural minded teachers, more revenue, etc.

(8) Returns from about half of the states regarding suggested solutions say that better trained teachers is the greatest need. Various other suggestions are offered, such as consolidation, supervision, better organized courses, higher standard for teachers, and establishment of departments of rural education, etc. (97)

A P P E N D I X

Text of Acts of Congress giving Federal land or funds to land-grant institutions and the Vocational Education Act.

Statistics of land-grant institutions having college courses in agriculture.

ACT OF 1862 DONATING LANDS FOR COLLEGES OF AGRICULTURE AND MECHANIC ARTS

[First Morrill Act]

AN ACT Donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State a quantity equal to thirty thousand acres for each Senator and Representative in Congress to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: *Provided,* That no mineral lands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted,* That the land aforesaid, after being surveyed shall be apportioned to the several States in sections or subdivisions of sections, not less than one-quarter of a section; and whenever there are public lands in a State subject to sale at private entry at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry at one dollar and twenty-five cents per acre to which said State may be entitled under the provisions of this act land scrip to the amount in acres for the deficiency of its distributive share; said scrip to be sold by said States and the proceeds thereof applied to the uses and purposes prescribed in this act and for no other use or purpose whatsoever: *Provided,* That in no case shall any State to which land scrip may thus be issued be allowed to locate the same within the limits of any other State or of any Territory of the United States, but their assignees may thus locate said land scrip upon any of the unappropriated lands of the United States subject to sale at private entry at one dollar and twenty-five cents, or less, per acre: *And provided further,* That not more than one million acres shall be located by such assignees in any one of the States: *And provided further,* That no such location shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted,* That all the expenses of management, superintendence, and taxes from date of selection of said lands, previous to their sales, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong, out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purposes hereinafter mentioned.

SEC. 4 (original). *And be it further enacted,* That all moneys derived from the sale of the lands aforesaid by the States to which the lands are apportioned, and from the sales of land scrip hereinbefore provided for, shall be invested in stocks of the United States or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the moneys so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section five of this act), and the interest of which shall be inviolably appropriated by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 4 (as amended Mar. 3, 1883). That all moneys derived from the sale of lands aforesaid by the States to which lands are apportioned, and from the sales of land scrip hereinbefore provided for, shall be invested in stocks of the United States or of the States, or some other safe stocks; or the same may be invested by the States having no State stocks in any other manner after the legislatures of such States shall have assented thereto, and engaged that such funds shall yield not less than five per centum upon the amount so invested and that the principal thereof shall forever remain unimpaired: *Provided,* That the moneys so invested or loaned shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section five of this act), and the interest of which shall be inviolably appropriated, by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 5. *And be it further enacted,* That the grant of land and land scrip hereby authorized shall be made on the following conditions, to which, as well as to the provisions hereinbefore contained, the previous assent of the several States shall be signified by legislative acts:

First. If any portion of the fund invested, as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished; and the annual interest shall be regularly applied without diminution to the purposes mentioned in the fourth section of this act, except that a sum, not exceeding ten per centum upon the amount received by any State under the provisions of this act, may be expended for the purchase of lands for sites or experimental farms whenever authorized by the respective legislatures and States.

Land Grant College Bill (cont.)

Second. No portion of said fund, nor the interest thereon, shall be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings.

Third. Any State which may take and claim the benefit of the provisions of this act shall provide, within five years, at least not less than one college, as described in the fourth section of this act, or the grant to such State shall cease; and said State shall be bound to pay the United States the amount received of any lands previously sold and that the title to purchasers under the State shall be valid.

Fourth. An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State industrial and economical statistics, as may be supposed useful, one copy of which shall be transmitted by mail free, by each, to all the other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

Fifth. When lands shall be selected from those which have been raised to double the minimum price, in consequence of railroad grants, they shall be computed to the States at the maximum price and the number of acres proportionately diminished.

Sixth. No State while in a condition of rebellion or insurrection against the Government of the United States shall be entitled to the benefit of this act.

Seventh. No State shall be entitled to the benefits of this act unless it shall express its acceptance thereof by its legislature within two years from the date of its approval by the President.

SEC. 6. *And be it further enacted*, That land scrip issued under the provisions of this act shall not be subject to location until after the first day of January, one thousand eight hundred and sixty-three.

SEC. 7. *And be it further enacted*, That the land officers shall receive the same fees for locating land scrip issued under the provisions of this act as is now allowed for the location of military bounty land warrants under existing laws: *Provided*, That their maximum compensation shall not be thereby increased.

SEC. 8. *And be it further enacted*, That the governors of the several States to which scrip shall be issued under this act shall be required to report annually to Congress all sales made of such scrip until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds.

Approved, July 2, 1862 (12 Stat. L. 503).

AGRICULTURAL EXPERIMENT STATIONS

ACT OF 1887 ESTABLISHING AGRICULTURAL EXPERIMENT STATIONS

[Hatch Act]

AN ACT To establish agricultural experiment stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science, there shall be established under direction of the college or colleges or agricultural departments of colleges in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July second, eighteen hundred and sixty-two, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to said act, a department to be known and designated as an "agricultural experiment station." *Provided,* That in any State or Territory in which two such colleges have been or may be so established the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the legislature of such State or Territory shall otherwise direct.

SEC. 2. That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under the varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and water; the chemical composition of manures, natural or artificial, with experiments designed to test the comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States and Territories.

SEC. 3. That in order to secure, as far as practicable, uniformity of methods and results in the work of said stations, it shall be the duty of the United States Commissioner [now Secretary] of Agriculture to furnish forms, as far as practicable for the tabulation of results of investigation or experiment; to indicate from time to time such lines of inquiry as to him shall seem most important, and, in general, to furnish such advice and assistance as will best promote the purpose of this act. It shall be the duty of each of said stations annually, on or before the first of February, to make to the governor of the State or Territory in which it is located a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the said Commissioner [now Secretary] of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same and as far as the means of the station will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore prescribed, the sum of fifteen thousand dollars per annum is hereby appropriated to each State, to be specially provided for by Congress in the appropriations from year to year, and to each Territory entitled under the provisions of section eight of this act, out of any money in the Treasury proceeding from the sales of public lands, to be paid in equal quarterly payments on the first day of January, April, July, and October in each year, to the treasurer or other officer duly appointed by the governing boards of said colleges to receive the same, the first payment to be made on the first day of October, eighteen hundred and eighty-seven: *Provided, however,* That out of the first annual appropriation so received by any station an amount not exceeding one-fifth may be expended in the erection, enlargement, or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per centum of such annual appropriation may be so expended.

Hatch Act (cont.)

SEC. 6. That whenever it shall appear to the Secretary of the Treasury from the annual statement of receipts and expenditures of any of said stations that a portion of the preceding annual appropriation remains unexpended, such amount shall be deducted from the next succeeding annual appropriation to such station, in order that the amount of money appropriated to any station shall not exceed the amount actually and necessarily required for its maintenance and support.

SEC. 7. That nothing in this act shall be construed to impair or modify the legal relation existing between any of the said colleges and the government of the States or Territories in which they are respectively located.

SEC. 8. That in States having colleges entitled under this section to the benefits of this act and having also agricultural experiment stations established by law separate from said colleges, such States shall be authorized to apply such benefits to experiments at stations so established by such States; and in case any State shall have established, under the provisions of said act of July second aforesaid, an agricultural department or experimental station in connection with any university, college, or institution not distinctly an agricultural college or school, and such State shall have established or shall hereafter establish a separate agricultural college or school, which shall have connected therewith an experimental farm or station, the legislature of such State may apply in whole or in part the appropriation by this act made to such separate agricultural college or school, and no legislature shall by contract, express or implied, disable itself from so doing.

SEC. 9. That the grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payment of such installment of the appropriation herein made as shall become due to any State before the adjournment of the regular session of its legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof duly certified to the Secretary of the Treasury.

SEC. 10. Nothing in this act shall be held or construed as binding the United States to continue any payments from the Treasury to any or all the States or institutions mentioned in this act, but Congress may at any time amend, suspend, or repeal any or all the provisions of this act.

Approved, March 2, 1887 (24 Stat. L. 440).

ACT OF 1890 FOR THE FURTHER ENDOWMENT OF LAND-GRANT COLLEGES

[Second Morrill Act]

AN ACT To apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July second, eighteen hundred and sixty-two, the sum of fifteen thousand dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of one thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be twenty-five thousand dollars, to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural, and economical science, with special reference to their applications in the industries of life and to the facilities for such instruction: *Provided,* That no money shall be paid out under this act to any State or Territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provisions of this act if the funds received in such State or Territory be equitably divided as hereinafter set forth: *Provided,* That in any State in which there has been one college established in pursuance of the act of July second, eighteen hundred and sixty-two, and also in which an educational institution of like character has been established, or may be hereafter established, and is now aided by such State from its own revenue, for the education of colored students in agriculture and the mechanic arts, however named or styled, or whether or not it has received money heretofore under the act to which this act is an amendment, the legislature of such State may propose and report to the Secretary of the Interior a just and equitable division of the fund to be received under this act, between one college for white students and one institution for colored students, established as aforesaid, which shall be divided into two parts, and paid accordingly and thereupon such institution for colored students shall be entitled to the benefits of this act and subject to its provisions, as much as it would have been if it had been included under the act of eighteen hundred and sixty-two, and the fulfillment of the foregoing provisions shall be taken as a compliance with the provision in reference to separate colleges for white and colored students.

SEC. 2. That the sums hereby appropriated to the States and Territories for the further endowment and support of colleges shall be annually paid on or before the thirty-first day of July of each year, by the Secretary of the Treasury, upon the warrant of the Secretary of the Interior, out of the Treasury of the United States, to the State or Territorial treasurer, or to such other officer as shall be designated by the laws of such State or Territory to receive the same, who shall upon the order of the trustees of the college or the institution for colored students, immediately pay over said sums to the treasurers of the respective colleges or other institutions entitled to receive the same, and such treasurers shall be required to report to the Secretary of Agriculture and to the Secretary of the Interior on or before the first day of September of each year a detailed statement of the amount so received and of its disbursement. The grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: *Provided,* That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of the State or Territory for the further and more completed endowment, support, and maintenance of colleges, or of institutions for colored students, as provided in this act, shall, by any action or contingency, be dismissed or lost, or be misapplied, it shall be replaced by the State or Territory to which it belongs, and until so

replaced no subsequent appropriation shall be apportioned or paid to such State or Territory; and no portion of said moneys shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings. An annual report by the president of each of said colleges shall be made to the Secretary of Agriculture, as well as to the Secretary of the Interior, regarding the condition and progress of each college, including statistical information in relation to its receipts and expenditures, its library, the number of its students and professors, and also as to any improvements and experiments made under the direction of any experiment stations attached to said colleges, with their cost and results and such other industrial and economical statistics as may be regarded as useful, one copy of which shall be transmitted by mail free to all other colleges further endowed under this act.

Land-Grant College Endowment Act (cont.)

SEC. 4. That on or before the first day of July in each year, after the passage of this act, the Secretary of the Interior shall ascertain and certify to the Secretary of the Treasury as to each State and Territory, whether it is entitled to receive its share of the annual appropriation for colleges, or of institutions for colored students, under this act and the amount which thereupon each is entitled, respectively, to receive. If the Secretary of the Interior shall withhold a certificate from any State or Territory of its appropriation, the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it should so desire, appeal to Congress from the determination of the Secretary of the Interior. If the next Congress shall not direct such sum to be paid it shall be covered into the Treasury. And the Secretary of the Interior is hereby charged with the proper administration of this law.

SEC. 5. That the Secretary of the Interior shall annually report to Congress the disbursements which have been made in all the States and Territories, and also whether the appropriation of any State or Territory has been withheld, and, if so, the reasons therefor.

SEC. 6. Congress may at any time amend, suspend, or repeal any or all of the provisions of this act.

Approved, August 30, 1890 (26 Stat. L. 417).

ACT OF 1906 FOR THE FURTHER ENDOWMENT OF AGRICULTURAL EXPERIMENT STATIONS

[Adams Act]

AN ACT To provide for an increased annual appropriation for agricultural experiment stations and regulating the expenditure thereof.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, to be paid as hereinafter provided, to each State and Territory, for the more complete endowment and maintenance of agricultural experiment stations now established or which may hereafter be established in accordance with the act of Congress approved March second, eighteen hundred and eighty-seven, the sum of five thousand dollars in addition to the sum named in said act for the year ending June thirtieth, nineteen hundred and six, and an annual increase of the amount of such appropriation thereafter for five years by an additional sum of two thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State or Territory shall be thirty thousand dollars, to be applied only to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective States or Territories.

SEC. 2. That the sums hereby appropriated to the States and Territories for the further endowment and support of agricultural experiment stations shall be annually paid in equal quarterly payments on the first day of January, April, July, and October of each year by the Secretary of the Treasury, upon the warrant of the Secretary of Agriculture, out of the Treasury of the United States, to the treasurer or other officer duly appointed by the governing boards of said experiment stations to receive the same, and such officers shall be required to report to the Secretary of Agriculture on or before the first day of September of each year a detailed statement of the amount so received and of its disbursement, on schedules prescribed by the Secretary of Agriculture. The grants of money authorized by this act are made subject to legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payment of such installments of the appropriation herein made as shall become due to any State or Territory before the adjournment of the regular session of legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof, duly certified by the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of any State or Territory for the further and more complete endowment, support, and maintenance of agricultural experiment stations as provided in this act shall by any action or contingency be diminished or lost or be misplaced, it shall be replaced by said State or Territory to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to such State or Territory; and no portion of said moneys exceeding five per centum of each annual appropriation shall be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings, or to the purchase or rental of land. It shall be the duty of each of said stations annually, on or before the first day of February, to make to the governor of the State or Territory in which it is located a full and detailed report of its operations, including a statement of receipts and expenditures, a copy of which report shall be sent to each of said stations, to the Secretary of Agriculture, and to the Secretary of the Treasury of the United States.

SEC. 4. That on or before the first day of July in each year after the passage of this act the Secretary of Agriculture shall ascertain and certify to the Secretary of the Treasury as to each State and Territory whether it is complying with the provisions of this act and is entitled to receive its share of the annual appropriation for agricultural experiment stations under this act and the amount which thereupon each is entitled, respectively, to receive. If the Secretary of Agriculture shall withhold a certificate from any State or Territory of its appropriation, the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it shall so desire, appeal to Congress from the determination of the Secretary of Agriculture. If the next Congress shall not direct such sum to be paid, it shall be covered into the Treasury; and the Secretary of Agriculture is hereby charged with the proper administration of this law.

SEC. 5. That the Secretary of Agriculture shall make an annual report to Congress on the receipts and expenditures and work of the agricultural experiment stations in all of the States and Territories, and also whether the appropriation of any State or Territory has been withheld, and if so, the reason therefor.

SEC. 6. That Congress may at any time amend, suspend, or repeal any or all of the provisions of this act.

Approved, March 16, 1906 (34 Stat. L. 63).

NELSON AMENDMENT FURTHER ENDOWING THE LAND-GRANT COLLEGES

Extract from the act making appropriations for the United States Department of Agriculture for the fiscal year ended June 30, 1903.

* * * That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July second, eighteen hundred and sixty-two, and the act of Congress approved August thirtieth, eighteen hundred and ninety, the sum of five thousand dollars, in addition to the sums named in the said act, for the fiscal year ending June thirtieth, nineteen hundred and eight, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of five thousand dollars over the preceding year, and the annual sum to be paid thereafter to each State and Territory shall be fifty thousand dollars, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July second, eighteen hundred and sixty-two, and the act of Congress approved August thirtieth, eighteen hundred and ninety.

That the sum hereby appropriated to the States and Territories for the further endowment and support of the colleges shall be paid by, to, and in the manner prescribed by the act of Congress approved August thirtieth, eighteen hundred and ninety, entitled "An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two," and the expenditure of the said money shall be governed in all respects by the provisions of the said act of Congress approved July second, eighteen hundred and sixty-two, and the said act of Congress approved August thirtieth, eighteen hundred and ninety: *Provided*, That said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts.

Approved, March 4, 1907 (34 Stat. L. 1256, 1281).

COOPERATIVE EXTENSION WORK

ACT OF 1914 PROVIDING FOR COOPERATIVE EXTENSION WORK

[Smith-Lever Act]

AN ACT To provide for cooperative agricultural extension work between the agricultural colleges in the several States receiving the benefits of an act of Congress approved July second, eighteen hundred and sixty-two, and of acts supplementary thereto, and the United States Department of Agriculture.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in order to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same, there may be inaugurated in connection with the college or colleges in each State now receiving, or which may hereafter receive, the benefits of the act of Congress approved July second, eighteen hundred and sixty-two, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts" (Twelfth Statutes at Large, page five hundred and three), and of the act of Congress approved August thirtieth, eighteen hundred and ninety (Twenty-sixth Statutes at Large, page four hundred and seventeen and chapter eight hundred and forty-one), agricultural extension work which shall be carried on in cooperation with the United States Department of Agriculture: *Provided*, That in any State in which two or more such colleges have been or hereafter may be established the appropriations hereinafter made to such State shall be administered by such college or colleges as the legislature of such State may direct: *Provided further*, That, pending the inauguration and development of the cooperative extension work herein authorized, nothing in this act shall be construed to discontinue either the farm management work or the farmers' cooperative demonstration work as now conducted by the Bureau of Plant Industry of the Department of Agriculture.

SEC. 2. That cooperative agricultural extension work shall consist of the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information and said subjects through field demonstrations, publications, and otherwise; and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges receiving the benefits of this act.

SEC. 3. That for the purpose of paying the expenses of said cooperative agricultural extension work and the necessary printing and distributing of information in connection with the same, there is permanently appropriated, out of any money in the Treasury not otherwise appropriated, the sum of \$480,000 for each year, \$10,000 of which shall be paid annually, in the manner hereinafter provided, to each State which shall by action of its legislature assent to the provisions of this act: *Provided*, That payment of such installments of the appropriation hereinbefore made as shall become due to any State before the adjournment of the regular session of the legislature meeting next after the passage of this act may, in the absence of prior legislative assent, be made upon the assent of the governor thereof, duly certified to the Secretary of the Treasury: *Provided further*, That there is also appropriated an additional sum of \$600,000 for the fiscal year following that in which the foregoing appropriation first becomes available, and for each year thereafter for seven years a sum exceeding by \$500,000 the sum appropriated for each preceding year, and for each year thereafter there is permanently appropriated for each year the sum of \$4,100,000 in addition to the sum of \$480,000 hereinbefore provided: *Provided further*, That before the funds herein appropriated shall become available to any college for any fiscal year plans for the work to be carried on under this act shall be submitted by the proper officials of each college and approved by the Secretary of Agriculture. Such additional sums shall be used only for the purposes hereinbefore stated, and shall be allotted annually to each State by the Secretary of Agriculture and paid in the manner hereinbefore provided, in the proportion which the rural population of each State bears to the total rural population of all the States as determined by the next preceding Federal census: *Provided further*, That no payment out of the additional appropriations herein provided shall be made in any year to any State until an equal sum has been appropriated for that year by the legislature of such State, or provided by State, county, college, local authority, or individual contributions from within the State, for the maintenance of the cooperative agricultural extension work provided for in this act.

SEC. 4. That the sums hereby appropriated for extension work shall be paid in equal semiannual payments on the first day of January and July of each year by the Secretary of the Treasury upon the warrant of the Secretary of Agriculture, out of the Treasury of the United States, to the treasurer or other officer of the State duly authorized by the laws of the State to receive the same; and such officer shall be required to report to the Secretary of Agriculture, on or before the first day of September of each year, a detailed statement of the amount so received during the previous fiscal year, and of its disbursement, on forms prescribed by the Secretary of Agriculture.

Smith-Lever Act (cont.)

SEC. 5. That if any portion of the moneys received by the designated officer of any State for the support and maintenance of cooperative agricultural extension work, as provided in this act, shall by any action or contingency be diminished or lost or be misapplied, it shall be replaced by said State to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to said State, and no portion of said moneys shall be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings, or the purchase or rental of land, or in college-course teaching, lectures in colleges, promoting agricultural trains, or any other purpose not specified in this act, and not more than five per centum of each annual appropriation shall be applied to the printing and distribution of publications. It shall be the duty of each of said colleges annually, on or before the first day of January, to make to the governor of the State in which it is located a full and detailed report of its operations in the direction of extension work as defined in this act, including a detailed statement of receipts and expenditures from all sources for this purpose, a copy of which report shall be sent to the Secretary of Agriculture and to the Secretary of the Treasury of the United States.

SEC. 6. That on or before the first day of July in each year after the passage of this act the Secretary of Agriculture shall ascertain and certify to the Secretary of the Treasury as to each State whether it is entitled to receive its share of the annual appropriation for cooperative agricultural extension work under this act, and the amount which it is entitled to receive. If the Secretary of Agriculture shall withhold a certificate from any State of its appropriation, the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the expiration of the Congress next succeeding a session of the legislature of any State from which a certificate has been withheld, in order that the State may, if it should so desire, appeal to Congress from the determination of the Secretary of Agriculture. If the next Congress shall not direct such sum to be paid, it shall be covered into the Treasury.

SEC. 7. That the Secretary of Agriculture shall make an annual report to Congress of the receipts, expenditures, and results of the cooperative agricultural extension work in all of the States receiving the benefits of this act, and also whether the appropriation of any State has been withheld, and if so, the reasons therefor.

SEC. 8. That Congress may at any time alter, amend, or repeal any or all of the provisions of this act.

Approved, May 8, 1914 (38 Stat. L. 372).

AN ACT To provide for the promotion of vocational education; to provide for cooperation with the States in promotion of such education in agriculture and the trades and industries; to provide for cooperation with the States in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby annually appropriated, out of any money in the Treasury not otherwise appropriated, the sums provided in sections two, three, and four of this act, to be paid to the respective States for the purpose of cooperating with the States in paying the salaries of teachers, supervisors, and directors of agricultural subjects, and teachers of trade, home economics, and industrial subjects, and in the preparation of teachers of agricultural, trade, industrial, and home economics subjects; and the sum provided for in section seven for the use of the Federal Board for Vocational Education for the administration of this act and for the purpose of making studies, investigations, and reports to aid in the organization and conduct of vocational education, which sums shall be expended as hereinafter provided.

SEC. 2. That for the purpose of cooperating with the States in paying the salaries of teachers, supervisors, or directors of agricultural subjects there is hereby appropriated for the use of the States, subject to the provisions of this act, for the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$500,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$750,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$1,000,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, the sum of \$1,250,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-two, the sum of \$1,500,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-three, the sum of \$1,750,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-four, the sum of \$2,000,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-five, the sum of \$2,500,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-six, and annually thereafter, the sum of \$3,000,000. Said sums shall be allotted to the States in the proportion which their rural population bears to the total rural population in the United States, not including outlying possessions, according to the last preceding United States census: *Provided*, That the allotment of funds to any State shall be not less than a minimum of \$5,000 for any fiscal year prior to and including the fiscal year ending June thirtieth, nineteen hundred and twenty-three, nor less than \$10,000 for any fiscal year thereafter, and there is hereby appropriated the following sums, or so much thereof as may be necessary, which shall be used for the purpose of providing the minimum allotment to the States provided for in this section: For the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$48,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$34,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$24,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, the sum of \$18,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-two, the sum of \$14,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-three, the sum of \$11,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-four, the sum of \$9,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-five, the sum of \$34,000; and annually thereafter the sum of \$27,000.

SEC. 3. That for the purpose of cooperating with the States in paying the salaries of teachers of trade, home economics, and industrial subjects there is hereby appropriated for the use of the States, for the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$500,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$750,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$1,000,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, the sum of \$1,250,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-two, the sum of \$1,500,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-three, the sum of \$1,750,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-four, the sum of \$2,000,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-five, the sum of \$2,500,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-six, the sum of \$3,000,000; and annually thereafter the sum of \$3,000,000. Said sums shall be allotted to the States in the proportion which their urban population bears to the total urban population in the United States, not including outlying possessions, according to the last preceding United States census: *Provided*, That the allotment of funds to any State shall be not less than a minimum of \$5,000 for any fiscal year prior to and including the fiscal year ending June thirtieth, nineteen hundred and twenty-three, nor less than \$10,000 for any fiscal year thereafter, and there is hereby appropriated the following sums, or so much thereof as may be needed, which shall be used for the purpose of providing the minimum allotment to the States provided for in this section: For the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$66,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$46,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$34,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, the sum of \$28,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-two, the sum of \$25,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-three, the sum of \$22,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-four, the sum of \$19,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-five, the sum of \$56,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-six, and annually thereafter, the sum of \$50,000.

That not more than twenty per centum of the money appropriated under this act for the payment of salaries of teachers of trade, home economics, and industrial subjects, for any year, shall be expended for the salaries of teachers of home economics subjects.

SEC. 4. That for the purpose of cooperating with the States in preparing teachers, supervisors and directors of agricultural subjects and teachers of trade and industrial and home economics subjects there is hereby appropriated for the use of the States for the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$500,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$700,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$900,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, and annually thereafter, the sum of \$1,000,000. Said sums shall be allotted to the States in the proportion which their population bears to the total population of the United States, not including outlying possessions, according to the last preceding United States census: *Provided*, That the allotment of funds to any State shall be not less than a minimum of \$5,000 for any fiscal year prior to and including the fiscal year ending June thirtieth, nineteen hundred and nineteen, nor less than \$10,000 for any fiscal year thereafter. And there is hereby appropriated the following sums, or so much thereof as may be needed, which shall be used for the purpose of providing the minimum allotment provided for in this section: For the fiscal year ending June thirtieth, nineteen hundred and eighteen, the sum of \$46,000; for the fiscal year ending June thirtieth, nineteen hundred and nineteen, the sum of \$32,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty, the sum of \$24,000; for the fiscal year ending June thirtieth, nineteen hundred and twenty-one, and annually thereafter, the sum of \$90,000.

SEC. 5. That in order to secure the benefits of the appropriations provided for in sections two, three, and four of this act, any State shall, through the legislative authority thereof, accept the provisions of this act and designate or create a State board, consisting of not less than three members, and having all necessary power to cooperate, as herein provided, with the Federal Board for Vocational Education in the administration of the provisions of this act. The State board of education, or other board having charge of the administration of public education in the State, or any State board having charge of the administration of any kind of vocational education in the State may, if the State so elect, be designated as the State board, for the purposes of this act.

In any State the legislature of which does not meet in nineteen hundred and seventeen, if the governor of that State, so far as he is authorized to do so, shall accept the provisions of this act and designate or create a State board of not less than three members to act in cooperation with the Federal Board for Vocational Education, the Federal board shall recognize such local board for the purposes of this act until the legislature of such State meets in due course and has been in session sixty days.

Any State may accept the benefits of any one or more of the respective funds herein appropriated, and it may defer the acceptance of the benefits of any one or more of such funds, and shall be required to meet only the conditions relative to the fund or funds the benefits of which it has accepted: *Provided*, That after June thirtieth, nineteen hundred and twenty, no State shall receive any appropriation for salaries of teachers, supervisors, or directors of agricultural subjects, until it shall have taken advantage of at least the minimum amount appropriated for the training of teachers, supervisors, or directors of agricultural subjects, as provided for in this act, and that after said date no State shall receive any appropriation for the salaries of teachers of trade, home economics, and industrial subjects until it shall have taken advantage of at least the minimum amount appropriated for the training of teachers of trade, home economics, and industrial subjects, as provided for in this act.

SEC. 6. That a Federal Board for Vocational Education is hereby created, to consist of the Secretary of Agriculture, the Secretary of Commerce, the Secretary of Labor, the United States Commissioner of Education, and three citizens of the United States to be appointed by the President, by and with the advice and consent of the Senate. One of said three citizens shall be a representative of the manufacturing and commercial interests, one a representative of the agricultural interests, and one a representative of labor. The board shall elect annually one of its members as chairman. In the first instance, one of the citizen members shall be appointed for one year, one for two years, and one for three years, and thereafter for three years each. The members of the board other than the members of the Cabinet and the United States Commissioner of Education shall receive a salary of \$5,000 per annum.

The board shall have power to cooperate with State boards in carrying out the provisions of this act. It shall be the duty of the Federal Board for Vocational Education to make, or cause to have made, studies, investigations, and reports, with particular reference to their use in aiding the States in the establishment of vocational schools and classes and in giving instruction in agriculture, trades, and industries, commerce and commercial pursuits, and home economics. Such studies, investigations, and reports shall include agriculture and agricultural processes and requirements upon agricultural workers; trades, industries, and apprenticeships, trade and industrial requirements upon industrial workers, and classification of industrial processes and pursuits; commerce and commercial pursuits and requirements upon commercial workers; home management, domestic science, and the study of related facts and principles; and problems of administration of vocational schools and of courses of study and instruction in vocational subjects.

When the board deems it advisable such studies, investigations, and reports concerning agriculture, for the purposes of agricultural education, may be made in cooperation with or through the Department of Agriculture; such studies, investigations, and reports concerning trades and industries, for the purposes of trade and industrial education, may be made in cooperation with or through the Department of Labor; such studies, investigations, and reports concerning commerce and commercial pursuits, for the purposes of commercial education, may be made in cooperation with or through the Department of Commerce; such studies, investigations, and reports concerning the administration of vocational schools, courses of study and instruction in vocational subjects may be made in cooperation with or through the Bureau of Education.

The Commissioner of Education may make such recommendations to the board relative to the administration of this act as he may from time to time deem advisable. It shall be the duty of the chairman of the board to carry out the rules, regulations, and decisions which the board may adopt. The Federal Board for Vocational Education shall have power to employ such assistants as may be necessary to carry out the provisions of this act.

SEC. 7. That there is hereby appropriated to the Federal Board for Vocational Education the sum of \$200,000 annually, to be available from and after the passage of this act, for the purpose of making or cooperating in making the studies, investigations, and reports provided for in section 6 of this act, and for the purpose of paying the salaries of the officers, the assistants, and such office and other expenses as the board may deem necessary to the execution and administration of this act.

SEC. 8. That in order to secure the benefits of the appropriation for any purpose specified in this act, the State board shall prepare plans showing the kinds of vocational education for which it is proposed that the appropriation shall be used; the kinds of schools and equipment; courses of study; methods of instruction; qualifications of teachers; and in the case of agricultural subjects the qualifications of supervisors or directors; plans for the training of teachers; and in the case of agricultural subjects, plans for the supervision of agricultural education, as provided for in section ten. Such plans shall be submitted by the State board to the Federal Board for Vocational Education, and if the

Federal board finds the same to be in conformity with the provisions and purposes of this act the same shall be approved. The State board shall make an annual report to the Federal Board for Vocational Education on or before September first of each year on the work done in the State and the receipts and expenditures of money under the provisions of this act.

SEC. 9. That the appropriation for the salaries of teachers, supervisors, or directors of agricultural subjects and of teachers of trade, home economics, and industrial subjects shall be devoted exclusively to the payment of salaries of such teachers, supervisors, or directors having the minimum qualifications set up for the State by the State board, with the approval of the Federal Board for Vocational Education. The cost of instruction supplementary to the instruction in agricultural and in trade, home economics, and industrial subjects provided for in this act necessary to build a well-rounded course of training, shall be borne by the State and local communities, and no part of the cost thereof shall be borne out of the appropriations herein made. The moneys expended under the provisions of this act, in cooperation with the States, for the salaries of teachers, supervisors, or directors of agricultural subjects, or for the salaries of teachers of trade, home economics, and industrial subjects, shall be conditioned that for each dollar of Federal money expended for such salaries the State or local community, or both, shall expend an equal amount for such salaries; and that appropriations for the training of teachers of vocational subjects, as herein provided, shall be conditioned that such money be expended for maintenance of such training and that for each dollar of Federal money so expended for maintenance the State or local community, or both, shall expend an equal amount for the maintenance of such training.

SEC. 10. That any State may use the appropriation for agricultural purposes, or any part thereof allotted to it, under the provisions of this act, for the salaries of teachers, supervisors, or directors of agricultural subjects, either for the salaries of teachers of such subjects in schools or classes or for the salaries of supervisors or directors of such subjects under a plan of supervision for the State to be set up by the State board, with the approval of the Federal Board for Vocational Education. That in order to receive the benefits of such appropriation for the salaries of teachers, supervisors, or directors of agricultural subjects the State board of any State shall provide in its plan for agricultural education that such education shall be that which is under public supervision or control; that the controlling purpose of such education shall be to fit for useful employment; that such education shall be of less than college grade and be designed to meet the needs of persons over fourteen years of age who have entered upon or who are preparing to enter upon the work of the farm or of the farm home; that the State or local community, or both, shall provide the necessary plant and equipment determined upon by the State board, with the approval of the Federal Board for Vocational Education, as the minimum requirement for such education in schools and classes in the State; that the amount expended for the maintenance of such education in any school or class receiving the benefit of such appropriation shall be not less annually than the amount fixed by the State board, with the approval of the Federal board as the minimum for such schools or classes in the State; that such schools shall provide for directed or supervised practice in agriculture, either on a farm provided for by the school or other farm, for at least six months per year; that the teachers, supervisors, or directors of agricultural subjects shall have at least the minimum qualifications determined for the State by the State board, with the approval of the Federal Board for Vocational Education.

SEC. 11. That in order to receive the benefits of the appropriation for the salaries of teachers of trade, home economics, and industrial subjects the State board of any State shall provide in its plan for trade, home economics, and industrial education that such education shall be given in schools or classes under public supervision or control; that the controlling purpose of such education shall be to fit for useful employment; that such education shall be of less than college grade and shall be designed to meet the needs of persons over fourteen years of age who are preparing for a trade or industrial pursuit or who have entered upon the work of a trade or industrial pursuit; that the State or local community, or both, shall provide the necessary plant and equipment determined upon by the State board, with the approval of the Federal Board for Vocational Education, as the minimum requirement in such State for education for any given trade or industrial pursuit; that the total amount expended for the maintenance of such education in any school or class receiving the benefit of

Smith-Hughes Act (cont.)

such appropriation shall be not less annually than the amount fixed by the State board, with the approval of the Federal board, as the minimum for such schools or classes in the State; that such schools or classes giving instruction to persons who have not entered upon employment shall require that at least half of the time of such instruction be given to practical work on a useful or productive basis, such instruction to extend over not less than nine months per year and not less than thirty hours per week; that at least one-third of the sum appropriated to any State for the salaries of teachers of trade, home economics, and industrial subjects shall, if expended, be applied to part-time schools or classes for workers over fourteen years of age who have entered upon employment, and such subjects in a part-time school or class may mean any subject given to enlarge the civic or vocational intelligence of such workers over fourteen and less than eighteen years of age; that such part-time schools or classes shall provide for not less than one hundred and forty-four hours of classroom instruction per year; that evening industrial schools shall fix the age of sixteen years as a minimum entrance requirement and shall confine instruction to that which is supplemental to the daily employment; that the teachers of any trade or industrial subject in any State shall have at least the minimum qualifications for teachers of such subject determined upon for such State by the State board, with the approval of the Federal Board for Vocational Education: *Provided*, That for cities and towns of less than twenty-five thousand population, according to the last preceding United States census, the State board, with the approval of the Federal Board for Vocational Education, may modify the conditions as to the length of course and hours of instruction per week for schools and classes giving instruction to those who have not entered upon employment, in order to meet the particular needs of such cities and towns.

SEC. 12. That in order for any State to receive the benefits of the appropriation in this act for the training of teachers, supervisors, or directors of agricultural subjects, or of teachers of trade, industrial or home economics subjects, the State board of such State shall provide in its plan for such training that the same shall be carried out under the supervision of the State board; that such training shall be given in schools or classes under public supervision or control; that such training shall be given only to persons who have had adequate vocational experience or contact in the line of work for which they are preparing themselves as teachers, supervisors, or directors, or who are acquiring such experience or contact as a part of their training; and that the State board, with the approval of the Federal board, shall establish minimum requirements for such experience or contact for teachers, supervisors, or directors of agricultural subjects and for teachers of trade, industrial, and home economics subjects; that not more than sixty per centum nor less than twenty per centum of the money appropriated under this act for the training of teachers of vocational subjects to any State for any year shall be expended for any one of the following purposes: For the preparation of teachers, supervisors, or directors of agricultural subjects, or the preparation of teachers of trade and industrial subjects, or the preparation of teachers of home economics subjects.

SEC. 13. That in order to secure the benefits of the appropriations for the salaries of teachers, supervisors, or directors of agricultural subjects, or for the salaries of teachers of trade, home economics, and industrial subjects, or for the training of teachers as herein provided, any State shall, through the legislative authority thereof, appoint as custodian for said appropriations its State treasurer, who shall receive and provide for the proper custody and disbursements of all money paid to the State from said appropriations.

SEC. 14. That the Federal Board for Vocational Education shall annually ascertain whether the several States are using, or are prepared to use, the money received by them in accordance with the provisions of this act. On or before the first day of January of each year the Federal Board for Vocational Education shall certify to the Secretary of the Treasury each State which has accepted the provisions of this act and complied therewith, certifying the amounts which each State is entitled to receive under the provisions of this act. Upon such certification the Secretary of the Treasury shall pay quarterly to the custodian for vocational education of each State the moneys to which it is entitled under the provisions of this act. The moneys so received by the custodian for vocational education for any State shall be paid out on the requisition of the State board as reimbursement for expenditures already incurred to such schools as are approved by said State board and are entitled to receive such moneys under the provisions of this act.

Smith-Hughes Act (cont.)

SEC. 15. That whenever any portion of the fund annually allotted to any State has not been expended for the purpose provided for in this act, a sum equal to such portion shall be deducted by the Federal board from the next succeeding annual allotment from such fund to such State.

SEC. 16. That the Federal Board for Vocational Education may withhold the allotment of moneys to any State whenever it shall be determined that such moneys are not being expended for the purposes and under the conditions of this act.

If any allotment is withheld from any State, the State board of such State may appeal to the Congress of the United States, and if the Congress shall not direct such sum to be paid it shall be covered into the Treasury.

SEC. 17. That if any portion of the moneys received by the custodian for vocational education of any State under this act, for any given purpose named in this act, shall by any action or contingency, be diminished or lost, it shall be replaced by such State, and until so replaced no subsequent appropriation for such education shall be paid to such State. No portion of any moneys appropriated under this act for the benefit of the States shall be applied, directly or indirectly, to the purchase, erection, preservation, or repair of any building or buildings or equipment, or for the purchase or rental of lands, or for the support of any religious or privately owned or conducted school or college.

SEC. 18. That the Federal Board for Vocational Education shall make an annual report to Congress, on or before December first, on the administration of this act and shall include in such report the reports made by the State boards on the administration of this act by each State and the expenditure of the money allotted to each State.

Approved, February 23, 1917.

ACT OF 1925 FOR THE MORE COMPLETE ENDOWMENT OF THE AGRICULTURAL
EXPERIMENT STATIONS

[Purnell Act]

AN ACT To authorize the more complete endowment of agricultural experiment stations, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the more complete endowment and maintenance of agricultural experiment stations now established, or which may hereafter be established, in accordance with the act of Congress approved March 2, 1887, there is hereby authorized to be appropriated, in addition to the amounts now received by such agricultural experiment stations, the sum of \$20,000 for the fiscal year ending June 30, 1926; \$30,000 for the fiscal year ending June 30, 1927; \$40,000 for the fiscal year ending June 30, 1928; \$50,000 for the fiscal year ending June 30, 1929; \$60,000 for the fiscal year ending June 30, 1930; and \$60,000 for each fiscal year thereafter, to be paid to each State and Territory; and the Secretary of Agriculture shall include the additional sums above authorized to be appropriated in the annual estimates of the Department of Agriculture, or in a separate estimate, as he may deem best. The funds appropriated pursuant to this act shall be applied only to paying the necessary expenses of conducting investigations or making experiments bearing directly on the production, manufacture, preparation, use, distribution, and marketing of agricultural products and including such scientific researches as have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry, and such economic and sociological investigations as have for their purpose the development and improvement of the rural home and rural life, and for printing and disseminating the results of said researches.

SEC. 2. That the sums hereby authorized to be appropriated to the States and Territories for the further endowment and support of agricultural experiment stations shall be annually paid in equal quarterly payments on the 1st day of January, April, July, and October of each year by the Secretary of the Treasury upon a warrant of the Secretary of Agriculture out of the Treasury of the United States, to the treasurer or other officer duly appointed by the governing boards of such agricultural experiment stations to receive the same and such officers shall be required to report to the Secretary of Agriculture on or before the 1st day of September of each year a detailed statement of the amount so received and of its disbursement on schedules prescribed by the Secretary of Agriculture. The grants of money authorized by this act are made subject to legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payment of such installments of the appropriation herein authorized to be made as shall become due to any State or Territory before the adjournment of the regular session of the legislature meeting next after the passage of this act shall be made upon the assent of the governor thereof duly certified to the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of any State or Territory for the further and more complete endowment, support, and maintenance of agricultural experiment stations as provided in this act shall by any action or contingency be diminished or lost or be misapplied, it shall be replaced by said State or Territory to which it belongs, and until so replaced no subsequent appropriation shall be apportioned or paid to such State or Territory, and no portion of said moneys exceeding 10 per centum of each annual appropriation shall be applied directly or indirectly, under any pretense whatever, to the purchase, erection, preservation, or repair of any building or buildings or to the purchase or rental of land. It shall be the duty of each of the said stations annually, on or before the 1st day of February, to make to the governor of the State or Territory in which it is located a full and detailed report of its operations, including a statement of receipts and expenditures for the fiscal year next preceding, a copy of which report shall be sent to each of the said stations and the Secretary of Agriculture and to the Secretary of the Treasury of the United States.

SEC. 4. That on or before the 1st day of July in each year after the passage of this act the Secretary of Agriculture shall ascertain and certify to the Secretary of the Treasury as to each State and Territory whether it is complying with the provisions of this act and is entitled to receive its share of the annual appropriations for agricultural experiment stations under this act and the amount which thereupon each is entitled, respectively, to receive. If the Secretary of Agriculture shall withhold from any State or Territory a certificate of its appropriation, the facts and reasons therefor shall be reported to the President and the amount involved shall be kept separate in the Treasury until the close of the next Congress in order that the State or Territory may, if it shall so desire, appeal to Congress from the determination of the Secretary of Agriculture. If the next Congress shall not direct such sum to be paid, it shall be covered into the Treasury. The Secretary of Agriculture is hereby charged with the proper administration of this law.

SEC. 5. That the Secretary of Agriculture shall make an annual report to Congress on the receipts and expenditures and work of the agricultural experiment stations in all of the States and Territories, and also whether the appropriation of any State or Territory has been withheld; and if so, the reason therefor.

SEC. 6. That Congress may at any time amend, suspend, or repeal any and all of the provisions of this act.

Approved, February 24, 1925.

Statistics of land-grant institutions having college courses in agriculture.

It is impracticable to make a satisfactory statistical exhibit of the development of the agricultural work of the land-grant institutions. In their earlier years such reports as were made generally gave statistics for the institution as a whole and in many later reports the work in agriculture and mechanic arts was combined. The varied and increasingly complex organization and finances of these institutions have greatly increased the difficulty of completely differentiating those statistical items which relate to their agricultural work.

The four tables given herewith, which have been compiled chiefly from recent bulletins of the Bureau of Education, may however be of some use as indicating the great growth of the agricultural work of the land-grant institutions after they became firmly established.

TABLE 1.

Land-grant institutions having agricultural work and the status of their agricultural faculties in 1920-21.

States and Territories.	Institution and location	Date of Opening	Date of Beginning of agricultural course.	Resident Instruction				Number of agricultural workers			
				Men	Women	Men	Women	Men	Women	Men	Women
Alabama	Alabama Polytechnic Institute, Auburn	1872	1872	34	1	115	48	22	0		
Arizona	University of Ariz., Tucson	1891	1891	16	0	17	6	30	0		
Arkansas	University of Arkansas, Fayetteville	1872	1872	21	0	67	33	21	0		
California	University of California, Berkeley	1869	1869	95	3	143	32	111	2		
Colorado	Colorado Agricultural College, Fort Collins	1879	1879	51	11	32	6	40	4		
Connecticut	Connecticut Agr. College, Storrs	1881 ²	1881	40	0	33	9	12	0		
Delaware	University of Delaware, Newark	1834	1870	13	1	5	4	5	0		
Florida	University of Florida, Gainesville	1884 ³	1884	20	0	45	37	14	2		
Georgia	Georgia State College, Athens	1872	1872	5	0	130	87	0	0		
Hawaii	University of Hawaii, Honolulu	1908	1908	3	0	1	1	0	0		
Idaho	University of Idaho, Moscow	1892	1892	24	1	39	13	27	0		
Illinois	University of Illinois, Urbana	1868	1868	66	1	95	6	21	2		
Indiana	Purdue University, Lafayette	1874	1874	41	0	130	13	51	1		
Iowa	Iowa State College of Agriculture and Mech. Arts, Ames	1869	1869	84	0	168	32	88	2		
Kansas	Kansas State Agricultural College, Manhattan	1863	1874	40	1	84	22	79	3		
Kentucky	University of Kentucky, Lexington	1866	1880	21	0	96	28	46	4		

Louisiana	Louisiana State University, Baton Rouge	1860	1887	12	0	83	49	26	3
Maine	University of Maine, Orono	1868	1868	20	2	24	9	13	7
Maryland	University of Maryland, College Park	1859	1859	34	0	44	27	24	3
Massachusetts	Massachusetts Agricultural College, Amherst	1867	1867	79	2	36	18	22	3
Michigan	Michigan Agricultural College, East Lansing	1857	1857	45	4	95	21	33	0
Minnesota	University of Minnesota, Minneapolis	1851	1869	164	29	93	22	44	9
Mississippi	Mississippi Agr. & Mech. Col., Agricultural College	1880 ⁴	1880	20	0	91	80	42	2
Missouri	University of Mo., Columbia	1841	1870	68	4	101	32	67	3
Montana	Montana State College of Agri- culture, Bozeman	1893	1893	18	0	39	12	26	0
Nebraska	University of Neb., Lincoln	1871	1871	71	13	72	16	33	0
Nevada	University of Nevada, Reno	1874	1888	14	0	12	4	6	0
New Hampshire	New Hampshire Col. of Agr. and Mechanic Arts, Durham	1866 ⁵	1866	22	1	18	9	17	0
New Jersey	Rutgers College, New Brunswick	1766	1865	31	0	33	14	53	2
New Mexico	New Mexico Col. of Agr. and Mech. Arts, State College	1890	1890	11	0	38	7	18	0
New York	Cornell University, Ithaca	1868	1868	180	0	152	69	63	1
North Carolina	North Carolina State Col. of Agr. and Engineering, West Raleigh	1889 ⁶	1889	23	0	136	9	19	0
North Dakota	North Dakota Agr. College, Agricultural College	1891	1891	11	0	58	10	40	2
Ohio	Ohio State University, Columbu	1873	1873	73	5	156	51	0	0
Oklahoma	Oklahoma Agr. & Mech. College, Stillwater	1891	1892	25	0	101	48	4	0
Oregon	Oregon Agricultural College, Corvallis	1865	1888	55	0	43	13	19	0
Pennsylvania	Pennsylvania State College, State College	1859	1859	75	1	104	30	18	0

Porto Rico	University of Porto Rico, San Juan	1903	1903	9	7	0	0	0	0
Rhode Island	Rhode Island State College, Kingston	1890	1890	8	0	4	3	11	1
South Carolina	Clemson Agricultural College, Clemson College	1893 ⁷	1893	20	2	76	60	20	2
South Dakota	South Dakota State College of Agr. and Mech. Arts, Brookings	1884	1884	24	1	57	7	18	0
Tennessee	University of Tennessee, Knoxville	1794	1869	34	2	69	60	18	2
Texas	Agricultural and Mech. Col. of Texas, College Station	1876	1876	92	0	248	10	83	0
Utah	Agricultural College of Utah, Logan	1890	1890	18	0	31	8	38	2
Vermont	University of Vermont and State Agr. Col., Burlington	1801	1885	13	0	24	10	13	0
Virginia	Virginia Agr. and Mech. Col. and Pol. Inst., Blacksburg	1872	1872	30	0	108	34	28	0
Washington	State College of Washington, Pullman	1892	1892	32	1	51	15	49	2
West Virginia	West Va. Univ., Morgantown	1868	1868	22	0	103	49	31	0
Wisconsin	Univ. of Wisconsin, Madison	1850	1866	97	3	158	24	72	16
Wyoming	Univ. of Wyoming, Laramie	1887	1887	8	0	19	9	8	0

- 1 Not including colleges exclusively for negroes
- 2 Instruction in agriculture was begun at Yale College in 1846, and this was the land-grant institution until 1893.
- 3 Removed from Lake City to Gainesville in 1905.
- 4 The University of Mississippi from 1871 to 1878 was the land-grant institution.
- 5 Connected with Dartmouth College at Hanover from 1866 until 1903. Made the Univ. of N. H. 1923.
- 6 The University of North Carolina from 1867 to 1889 was the land-grant institution.
- 7 From 1882 to 1889 the University of South Carolina was the land-grant institution.

Number of agricultural students and graduates in land-grant institutions¹ at different times.

State	Students in agriculture						Graduates				
	In all courses		In degree courses				1894	Bachelor	1922	Master	Doctor
	1894	1902	1911	1902	1911	1923					
Ala.	135	32	321	24	114	157	12	20	---	---	---
Alaska	---	---	---	---	---	2	---	---	---	---	---
Ariz.	---	---	26	---	20	177	---	15	3	1	---
Arkansas	33	11	148	11	63	130	1	9	---	---	---
Calif.	14	136	372	91	322	565	3	122	22	3	---
Colorado	58	32	69	22	69	346	4	32	4	---	---
Conn.	122	55	188	50	63	165	10	42	---	---	---
Delaware	6	8	31	4	20	36	---	5	---	---	---
Florida	---	36	27	36	19	117	---	10	---	---	---
Georgia	83	24	172	5	89	137	2	37	1	---	---
Hawaii	---	---	10	---	4	17	---	---	2	---	---
Idaho	10	---	101	---	41	136	---	13	---	---	---
Illinois	33	266	718	138	718	770	1	163	12	1	---
Indiana	63	114	423	42	331	498	3	102	5	---	---
Iowa	179	601	1156	255	589	905	4	135	44	---	---
Kansas	460	342	451	219	157	476	39	84	5	---	---
Kentucky	1	13	138	10	70	142	---	18	1	---	---
Louisiana	15	44	179	44	61	128	1	12	1	---	---
Maine	14	25	210	4	78	110	2	17	2	---	---
Maryland	15	16	58	1	25	144	5	20	2	---	---
Mass.	204	171	637	143	506	483	34	92	3	1	---
Michigan	181	275	697	127	463	365	14	74	10	---	---
Minnesota	175	75	692	18	121	451	20	46	25	16	---
Miss.	216	201	398	201	388	375	8	64	1	---	---
Missouri	2	162	762	95	457	494	3	65	19	3	---
Montana	15	22	108	1	45	151	---	6	---	---	---
Nebraska	19	206	630	160	153	265	1	34	1	---	---
Nevada	6	---	23	---	23	30	0	5	---	---	---
N. H.	27	36	340	26	50	184	1	17	---	---	---

Students in agriculture

In all courses In degree courses
1894 1902 1911 1902 1911 1923

Graduates

1804 1922

NEW JERSEY

	Students in agriculture						Graduates			
	In all courses			In degree courses			1804	1922		
	1894	1902	1911	1902	1911	1923	Bachelor	Bachelor	Master	Doctor
New Jersey	3	13	116	13	48	99	--	19	4	4
New Mexico	3	8	10 ²	5	10 ³	44	3	3	0	--
New York	106	181	1418 ²	60	967 ³	783	--	171	23	--
No. Car.	31	101	293	45	157	212	2	36	7	--
No. Dak.	8	398	390	2	53	76	--	5	2	--
Ohio	89	135	520	77	396	716	3	121	--	--
Oklahoma	49	41	655	17	136	219	--	27	2	--
Oregon	47	90	652	70	247	520	4	99	2	--
Penn.	34	1826	424	14	214	445	0	137	9	--
Porto Rico	--	----	35	--	----	35	--	1	--	--
R. I.	60	25	72	3	37	46	12	7	--	--
So. Car.	122	205	44	205	37	310	--	43	--	--
So. Dak.	20	18	223	15	43	118	3	5	1	--
Tennessee	31	104	166	67	72	137	--	21	2	--
Texas	187	172	514	150	363	638	7	71	3	--
Utah	37	49	509	6	132	153	1	25	1	--
Vermont	86	44	116	40	76	68	1	7	--	--
Washington	15	6	148	6	94	254	--	46	5	--
West Va.	11	5	76	2	36	125	1	18	--	--
Wisconsin	173	332	1014	32	457	433	20	92	39	13
Wyoming	0	4	12	4	12	17	--	2	--	--
Virginia	70	50	123	50	91	98	1	20	2	--

- 1 Not including colleges exclusively for negroes.
- 2 Including students in correspondence courses.
- 3 Including students in home economics.

The 1862 land-grant fund and other land-grant funds, year ended June 30, 1923.

Federal land-grant of 1862 or grants in lieu thereof.

Other federal land-grants.

State	No. of acres received	Unsold land		Amount of fund, without value of unsold land.	Income	Acres	Unsold land		Amount of fund without value of unsold land
		Acres	Value				Value		
Alabama	240,000	-----	-----	\$253,500.00	\$20,280.00	-----	-----	-----	-----
Arizona	150,000	140,312.99	-----	3,855.91	167.00	291,318.24	-----	\$427,260.61	-----
Arkansas	150,000	-----	-----	132,666.67	6,903.34	-----	-----	-----	-----
California	150,000	1,162.20	\$ 10,818.27	746,240.37	42,292.85	320.00	\$ 800.00	74,962.27	-----
Colorado	90,000	28,094.11	8,331,000.00	327,975.49	19,185.15	-----	-----	-----	-----
Connecticut	180,000	-----	-----	135,000.00	6,750.00	-----	-----	-----	-----
Delaware	90,000	-----	-----	83,000.00	4,980.00	-----	-----	-----	-----
Florida	90,000	-----	-----	153,800.00	5,190.50	-----	-----	132,000.00	-----
Georgia	270,000	-----	-----	242,202.17	16,954.14	-----	-----	-----	-----
Idaho	90,000	25,457.51	454,575.10	753,059.28	34,365.72	131,881.37	1,318,813.70	1142,516.51	-----
Indiana	390,000	-----	-----	340,000.00	17,000.00	-----	-----	-----	-----
Illinois	480,000	-----	-----	649,012.91	32,450.66	-----	-----	-----	-----
Iowa	204,309	-----	-----	592,463.46	32,233.94	-----	-----	-----	-----
Kansas	90,000	7,184.25 ¹	71,842.50	505,508.56	25,986.87	-----	-----	-----	-----
Kentucky	330,000	-----	-----	165,000.00	8,644.50	-----	-----	-----	-----
Louisiana	209,920	-----	-----	182,313.80	9,115.69	-----	-----	136,000.00	-----
Maine	210,000	-----	-----	118,300.00	5,915.00	-----	-----	-----	-----
Maryland	210,000	-----	-----	117,643.60	4,784.49	-----	-----	-----	-----
Massachusetts	360,000	-----	-----	219,000.00	10,950.00	-----	-----	-----	-----
Michigan	235,663	50,523.30	100,000.00	1,003,495.12	70,618.98	-----	-----	-----	-----
Minnesota	94,439	-----	-----	563,183.11	28,159.16	13,149.25	78,895.50	610,491.61	-----
Mississippi	209,920	-----	-----	212,150.00	5,914.50	-----	-----	239,212.55	-----
Missouri	277,067	44,092.00	176,328.00	424,120.77	18,366.57	-----	-----	122,000.00	-----
Montana	138,954	60,204.40	602,044.00	247,398.02	30,262.01	35,627.80	356,278.00	513,456.51	-----
Nebraska	90,000	1,726.91	43,172.75	640,076.57	46,309.64	6,877.91	171,947.75	274,130.32	-----
Nevada	90,000	13.49	16.85	115,457.07	5,672.50	-----	-----	51,654.21	-----
New Hampshire	150,000	-----	-----	80,000.00	4,800.00	-----	-----	-----	-----
New Jersey	210,000	-----	-----	116,000.00	5,800.00	-----	-----	-----	-----
New Mexico	150,000 ²	244,248.00	404,134.42	103,105.89	2,375.86	-----	-----	-----	-----
New York	989,920	-----	-----	688,576.12	34,428.80	-----	-----	-----	-----

94

Table 3 (cont.)

No. Carolina	270,000	-----	-----	-----	125,000.00	7,500.00	-----	-----	-----
North Dakota	130,000	21,887.55	218,875.50	1,569,406.50	51,372.73	-----	-----	-----	-----
Ohio	629,000	-----	-----	524,176.50	31,450.60	-----	-----	-----	225,600.51
Oklahoma ³	250,000	58,735.79	117,844.00	731,562.63	33,904.69	-----	-----	-----	-----
Oregon	89,908	820.00	8,000.00	203,310.98	13,370.41	-----	-----	-----	-----
Pennsylvania	780,000	-----	-----	500,000.00	30,000.00	-----	-----	-----	17,000.00
Rhode Island	120,000	-----	-----	50,000.00	2,337.50	-----	-----	-----	-----
So. Carolina	180,000	-----	-----	191,800.00	5,754.00	-----	-----	-----	-----
South Dakota	160,000	97,065.40	970,654.00	659,603.85	15,313.79	32,381.79	323,817.90	219,867.98	-----
Tennessee	300,000	-----	-----	400,000.00	23,960.00	-----	-----	-----	-----
Texas	180,000	-----	-----	209,000.00	10,450.00	-----	-----	-----	-----
Utah	200,000	514.65	1,286.62	284,557.09	13,947.24	-----	-----	-----	-----
Vermont	149,920	-----	-----	135,500.00	8,130.00	-----	-----	-----	-----
Virginia	300,000	-----	-----	516,468.00	20,658.72	-----	-----	-----	-----
Washington	89,438	69,101.86	1,382,037.20	666,545.83	30,607.46	79,488.52	1,589,770.40	801,794.68	-----
West Virginia	150,000	-----	-----	114,900.00	5,999.00	-----	-----	-----	-----
Wisconsin	240,005	40.00	120.00	303,594.61	12,382.89	160.63	790.00	233,036.50	-----
Wyoming	89,832	68,616.17	700,000.00	318,565.15	8,721.90	32,748.86	1,940,000.00	1,192,338.11	-----
Total	10,928,295	939,800.58	13,592,749.21	17,418,096.03	877,718.80	623,954.37	5,781,113.25	7,413,322.37	-----

- 1 Approximately
- 2 Unsold land from the Ferguson Act and the enabling act is not kept separate.
- 3 The Federal act making Oklahoma grant does not specifically state that the grant was in lieu of the 1862 grant.

Table 4

Historical Review of Statistics of Land-grant colleges.

Professors, students, finances		1911-12	1916-17	1921-22	1922-23
I. Professors and Instructors.					
Professors, instructors, extension workers and exper- iment station staff:					
In institutions for white students -----	7,161	9,800	20,619	17,536	
In institutions exclusively for colored students----	421	544	591	632	
Total -----	7,582	10,344	21,210	18,168	
II. Student Enrollment.					
Total enrollments:					
In institutions for white students -----	84,633	122,053	204,834	229,033	
In institutions exclusively for colored students---	8,099	11,352	10,028	10,797	
Total -----	92,732	133,405	214,862	239,830	
Students in certain regular college courses of study in institutions for white students:					
Agriculture-----	9,720	15,289	14,398	13,502	
Forestry -----	487	347	629	588	
Veterinary science-----	494	773	450	525	
Home economics -----	2,506	5,055	6,090	7,023	
Mechanical engineering -----	4,518	4,417	5,012	6,112	
Civil engineering -----	4,280	2,868	4,842	5,149	
Electrical engineering -----	3,106	3,256	6,814	7,377	
Mining engineering -----	776	871	1,590	1,383	
Chemical engineering -----	466	1,505	2,448	2,011	
General engineering -----	1,701	2,351	5,283	2,117	
Architecture-----	855	964	659	879	
Pharmacy -----	153	377	1,780	2,095	
Students in military science and tactics:					
In institutions for white students-----	20,299	33,704	37,399	40,957	
In institutions exclusively for colored students---	2,348	1,415	1,319	1,183	
	22,647	35,119	38,718	42,140	

Table 4 (cont.)

III. Degrees Conferred. Baccalaureate or first degree:

	1911-12	1916-17	1921-22	1922-23
In agricultural courses of study -----	1,073	2,083	2,239	2,748
In engineering (mechanic arts) courses -----	2,112	2,404	3,682	4,284
In home economics -----	255	787	861	920
All other courses of study -----	3,921	5,367	8,608	10,577
Total -----	7,361	11,361	15,390	18,529

Advanced degrees:

In agricultural courses of study -----	109	221	307	349
In engineering (mechanic arts) courses -----	163	186	380	418
In home economics -----	3	9	---	25
In all other courses of study -----	676	897	987	1,400
Total -----	951	1,313	1,674	2,192

IV. Books and Pamphlets in Libraries.

Number of bound volumes -----	2,828,222	3,982,816	5,586,303	5,496,045
Number of pamphlets -----	968,110	1,466,858	---	---
Total -----	3,796,332	5,449,674	5,586,303	5,496,045

V. Income.

State funds:

From endowments granted by the State-----	\$ 93,639	\$ 160,766	\$ 116,858	\$ 186,502
From mill-tax levy and appropriations for support-----	10,151,049	16,742,378	32,170,761	34,473,844
From mill-tax levy and appropriations for permanent improvements -----	4,644,540	4,475,818	2,347,609	8,415,803
Total State aid --	14,889,228	21,378,962	41,635,228	43,076,149

United States funds:

From land-grant fund of 1862 -----	832,673	930,170	907,007	901,872
From other land-grant funds -----	197,078	241,840	370,010	388,903
From Morrill-Nelson funds of 1890 and 1907	2,500,000	2,515,171	2,501,644	2,550,000
Total Federal aid--	3,529,751	3,687,181	3,778,661	3,840,775

1. Not including institutions exclusively for colored students.
2. Included under arts and science.

Table 4 (cont.)

V. Income (cont.)

	1911-12	1916-17	1921-22	1922-23
Institutional funds:				
From college endowment funds -----	\$ 780,658	1,399,607	2,051,589	2,194,946
From tuition fees, board, and lodging -----	2,567,188	6,077,868	13,999,053	14,337,163
From departmental earnings -----	-----	2,970,412	4,875,516	5,418,983
From private gifts -----	935,912	1,213,394	4,544,796	4,748,465
Miscellaneous-----	2,115,251	1,113,836	3,226,463	4,349,052
Total institutional funds -----	\$ 6,399,009	12,775,117	28,697,417	31,048,609
Grand total of income for instruction and administration -----	24,817,988	37,841,260	74,111,306	77,970,395
Funds for the experiment stations:				
State funds -----	870,789	1,588,883	4,574,025	5,107,744
United States funds -----	1,357,438	1,369,700	1,371,500	1,366,175
Private gifts -----	-----	242,620	214,553	375,054
Experiment station earnings -----	-----	1,213,216	1,586,410	1,607,270
Total funds for experiment stations -----	2,228,227	4,414,419	7,746,488	8,456,243
Other research funds -----	-----	-----	-----	449,484
Regulatory service funds -----	-----	-----	-----	333,535
Funds for the extension service:				
State funds, Smith-Lever and others -----	553,900	2,318,975	5,318,975	5,413,025
United States funds -----	-----	1,411,836	6,106,409	6,168,661
County, city, or association funds -----	-----	696,334	3,774,541	4,168,030
Private gifts and miscellaneous -----	-----	79,985	989,746	1,229,280
Total for extension service -----	553,900	4,513,718	16,189,671	16,978,996
Vocational teacher-training (Smith-Hughes funds) -----	-----	-----	-----	442,060
Grand total income of institutions -----	27,600,115	45,769,397	98,047,465	104,639,113

Table 4 (cont.)

VI. Value of Property.		1911-12	1916-18	1921-22	1922-23
Land-grant funds, including unsold land -----		28,493,644	31,884,639	33,359,126	44,205,280
Other endowment funds -----		16,727,116	34,482,447	48,815,563	49,626,440
Farms, grounds, and buildings -----		65,611,813	96,557,121	138,922,991	148,143,342
Apparatus and machinery -----		12,359,622	22,198,115	32,632,867	34,809,976
Libraries -----		5,632,348	6,685,958	10,257,825	10,375,682
Livestock -----		824,004	1,599,928	2,336,207	2,354,833
Total -----		129,648,547	193,408,208	266,324,579	289,515,553
VII. Federal Land-Grant funds.					
Land-grant of 1862: -----					
Value of fund -----		13,524,671	15,060,548	17,134,126	17,418,096
Value of unsold land -----		4,943,064	7,316,326	6,117,611	13,592,749
Other land grants: -----					
Value of fund -----		3,368,558	3,729,065	6,440,404	7,413,322
Value of unsold land -----		6,657,351	5,778,700	3,814,250	5,781,113
		<u>28,493,639</u>	<u>31,884,639</u>	<u>33,506,391</u>	<u>44,205,280</u>

- 1 Not including institutions exclusively for colored students.
- 2 Included under arts and science.
- 3 Not including board and lodging.
- 4 Included under miscellaneous
- 5 Not reported
- 6 Private and miscellaneous

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150

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I N D E X

	Page
Abbot, Theophilus Capen, advocates course in household economy at	
Mich. Agr. Col.	413
rel. to Mich. Agr. Col.	405
rel. to Washington convention, 1872.	535, 537
rel. to Washington convention, 1883.	559, 560
Academies in England.	11
in the United States, 1820-1869.	160
Academy at Philadelphia.	36, 137
Richmond, Va.	51
of Agriculture in France.	28
Accum, Frederick, school of chemistry.	18
Adams, Charles Kendall, pres. of Cornell Univ. (N. Y.).	505, 510
rel. to A. A. A. C. E. S.	568
Daniel, Agricultural reader.	155
Henry Cullen, rel. to act for Fed. aid to agr. expt. stas. 1906.	607
John, author of education section of Mass. Constitution of 1780.	42, 43
John Quincy, pres. of Columbian Inst. for Prom. of Arts and	
Sciences.	129
Samuel, rel. to Mass. Soc. for Prom. Agr.	97
Adamson, William, rel. to bill for Fed. aid to branch agr. expt. stas..	856
Addams, Jane, rel. to Natl. Soc. for the Prom. of Industrial Educ.	847
Adlum, John, Best mode of making wine.	154
Cultivation of the vine in America.	154
Agassiz, Louis, favored union of agr. col. with Harvard Univ.	289
member of Mass. State Bd. of Agr.	169
rel. to Cornell Univ. (N. Y.).	503
rel. to Mass. Agr. Col.	169
rel. to Mass. Inst. of Technology.	288
teacher of natural sciences.	168
Agricultural books, early.	153
Agricultural chemistry, development of courses, 1900-1914.	652
Elements of, Davy.	18
in Philadelphia College.	39
Agricultural colleges (See also Agricultural Education).	
agricultural extension work	591, 695
boys' and girls' clubs	
1906-1914.	700, 701, 702
animals at.	603
buildings, 1900-1914.	595
connected with State universities after 1877.	402
convention at Washington, D. C., 1885.	564
courses in rural economics, 1919-1925.	746, 763
sociology, 1919-1925.	747, 763
short.	692, 767
at Univ. of Wis., 1886.	573
credit for high school agriculture.	804
development of, 1900-1914.	587

Agricultural colleges (cont.)

development of courses, 1900-1914.....	
agriculture.....	622
agricultural chemistry.....	652
agronomy.....	626
agrotechny.....	639
animal husbandry.....	637
botany.....	633
dairying.....	639
entomology.....	659
forestry.....	635
home economics.....	672
horticulture.....	633
rural economics.....	643
rural engineering.....	641
rural sociology.....	650
soils.....	626
veterinary medicine.....	663
development of textbooks and manuals on agriculture and related sciences.....	604
elementary instruction.....	694
equipment, 1900-1914.....	601
farms.....	604
general conditions favoring growth, 1900-1914.....	587
graduate school of agriculture, 1902-1916.....	609
session at Ohio State Univ., 1902	610
Univ. of Ill., 1906..	615
N. Y. Col. of Agr., at Cornell Univ. 1908	616
Iowa State Col., 1910	616
Mich. Agr. Col., 1912	618
Univ. of Mo., 1914...	619
Mass. Agr. Col., 1916	620
graduate students in agriculture, 1915-1916.....	621
graduate study, promotion of.....	608
improvement of curricula, 1919-1925.....	740
libraries.....	603
organization, 1900-1914.....	588
post-war work, 1919-1925.....	734
progress in research work, 1919-1925.....	766
rel. to agricultural convention at Washington, 1872...	400, 535
rel. to agricultural instruction of soldiers in France, 1919...	733
rel. to farmers, 1873-1887.....	402
rel. to rehabilitation of soldiers.....	734
relations with State departments of agriculture.....	716
secondary education	691, 780, 790, 792 795, 796, 803
separate from universities established 1880-1893.....	402
status, 1915-1925.....	723, 772
student labor.....	264, 425, 426, 430, 442, 457 478, 484, 486, 524, 569, 605
teacher training.....	689
teacher training in Nelson amendment to Morrill Act of 1890.....	690
teacher training under Smith-Hughes Voc. Educ. Act....	717, 833

	Page
Agricultural convention at Washington, 1872.....	535
1882.....	558
1883.....	559
education (See also Agricultural colleges and Agricultural schools).....	
1873-1887.....	398
advocated by James Tallmadge.....	205
American Asso. for the Advancement of Agricultural Teaching.....	803
at conventions, Washington, D. C., 1882 and 1883....	558
Chicago, Ill., 1871.....	386, 534
Hilgard's report.....	473
Mass. agricultural societies, 1851..	146
at State institutions.....	
Connecticut	
Seminary at Derby.....	176
Washington (now Trinity) College...	192
Yale Scientific School.....	247
Maine	
Gardiner Lyceum.....	173, 175
Maryland	
Cokesbury College.....	170
Md. State Agr. Soc.'s plan for National agr. dept.....	312
Massachusetts	
Amherst College.....	193
Boston Asylum and Farm School.....	177
Bussey Institution.....	192
Smith's Agricultural School.....	184
Teachers' Seminary at Andover, Mass.	183
Michigan	
Mich. Agr. Col.....	245
rel. of State Agr. Soc.....	235
Univ. of Mich.....	235, 236
	237, 239
Minnesota	
Univ. of Minn.....	243
Univ. of Minn.....	574
Mississippi	
Univ. of Miss.....	472
New Jersey	
Farm of James J. Mapes, near Newark	185
New York	
Buel's plan for agr. school.....	204
Columbia College.....	46, 92
King's College.....	90
Literary institution at Chittenango	182
Movement for.....	201
New York Central College.....	184
Ovid Academy.....	221
Relation of S. L. Mitchill.....	92
Rensselaer Institute.....	190
Watson's plan for pattern farm.....	203
Ohio	
Farmers' College.....	194
Pennsylvania	
Mount Airy Agricultural Institute..	185
Tennessee	
Franklin college.....	187

	Page
agricultural education, classes and numbers of schools teaching agr. 1915...	841
dairy school at Univ. of Wis., 1886.....	573
departments of, in land-grant institutions.....	717
Dolliver bill for Fed. aid to, in secondary schools. 851,	857
early boys' and girls' clubs.....	914
elementary, for schools of Calif., in rept. of O.E.S. 1906...	911
in private schools.....	917
State forces for.....	916
syllabus of course by committee on instruc. in agr. of A.A.A.C.E.S.....	910
textbooks.....	913
essay on, Edmund Ruffin.....	126
evolution of, paper by Fairchild.....	684
Federal land grant for agricultural schools in Mich., resolution of legislature, 1850.....	236
for negroes.....	707
1917.....	917
under Smith-Hughes Act.....	890
foundations of American system.....	3
general status under Smith-Hughes Act.....	889
home projects in elementary schools.....	918
under Smith-Hughes Act.....	889
in appeal for funds for Philadelphia College.....	90
in consolidated schools.....	907
in elementary schools.....	694, 894, 906
rel. of nature study to.....	898
in high schools, general status, 1905-1915.....	837
with State aid.....	826
without State aid.....	831
in land-grant colleges 1862-1872.....	383
in normal schools.....	805
proposed in Florida, in 1851.....	185
in private colleges.....	186, 707
in schools receiving benefits of Smith-Hughes Act...	887
in U. S., general influence of. Kans. State Agr. Col. 1863-1887....	433
Mich. Agr. Col. 1857-1887	419
Jefferson's letter on.....	121
Mass. Commission on.....	280
memorial to Congress, by Jos. L. Smith, and others.. Chas. L. Fleischman.....	306
National movement for.....	305
plan for professorship in Univ. of Va.....	232
Page bill for Fed. aid to, in secondary schools.....	859
preparation for large undertakings 1871-1900.....	532
promotion of, in secondary schools, by U. S. Bur. of Educ.....	798

Agricultural education, (cont.)	Page
rel. of A. A. A. C. E. S., 1890-1900.....	572
Jefferson to.....	232
Mass. State Bd. of Agr. to.....	147
nature study to.....	898
Partridge to.....	289, 292
school garden movement to.....	898
voluntary board of agriculture in Mass.....	146
secondary, Davis bill for Fed. aid to.....	849, 856
disappearance of, 1862-1880.....	775
in private schools, 1900-1915.....	837
new movement for, 1881-1900.....	776
rel. of Nat'l Educ. Asso. to.....	799
report of committee on industrial educ.	
of N.E.A.....	799
under the Smith-Hughes Act, 1917-1925...	871
with Fed. aid, 1917-1925.....	842
without Fed. aid, 1900-1916.....	790
work of Fed. Bd. for Vocational Educ....	874
Off. of Expt. Stas. relating to.	788, 791
State supervision under Smith-Hughes Act.....	885
teacher training under Smith-Hughes Act.....	883
Agricultural engineering (See Rural engineering).....	
experiments at	
Ala. Agr. and Mech. Col., 1875-1877.....	469
Ill. Industrial Univ., 1867-1887.....	530
Iowa State Agr. Col., 1858-1887.....	464
Mass. Agr. Col., 1867-1887.....	451
Mich. Agr. Col., 1857-1877.....	417
Miss. Agr. and Mech. Col., 1883-1887.....	477
New York, Cornell Univ., 1874-1887.....	511
Penn. Agr. Col., 1857-1887.....	479, 491
experiments by George Washington.....	114
discussed at Chicago convention, 1871.....	533
Agricultural experiment station, at	
Conn., Storrs Agr. Sch.....	778
N. Y., Cornell Univ., 1879-1887.....	511
movement in land-grant colleges, 1873-1887	338
stations, 1875-1887.....	557
1919-1925.....	766
branch, Adamson bill.....	856
Davis bill.....	856
Dolliver bill for Fed. aid to....	857
Page bill.....	859
committee on, at Wash. convention, 1872..	537
discussed at Chicago convention, 1871....	534
Wash. convention, 1872.....	400
1883.....	401, 560
early State.....	400
legislation	
Adams Act.....	606, 607
Carpenter bill, 1882.....	560, 561
Cullen bill, 1884.....	563, 564
Hatch Act, 1887.....	565
Holmes bill, 1883.....	561, 563
Knapp's (S. A.) bills 1882-83.	401, 561
Purnell Act, 1925.....	767

	Page
(Agricultural) Experiment Stations, Office of, rel. to A. A. A. C. E. S.....	568
Agricultural Experiment Stations, organization under Hatch Act, 1887-1914.....	588
rel. to A. A. A. C. E. S.....	590
Agricultural extension work, boys' and girls' clubs, 1906-1914.....	700, 701, 702
by agricultural colleges, 1873-1887.....	388
1900-1914.....	591, 695
under Smith-Lever Act...	712
war work, 1917-1919.....	732
Ala. Agr. and Mech. Col., 1872-1887.....	470
Ill. Industrial Univ., 1869-1887.....	531
Iowa State Agricultural College, 1870-1887.....	465
Mass. Agr. Col., 1863-1887.....	453
Miss. Agr. and Mech. Col., 1880-1887.....	477
New York, Cornell Univ., 1867-1887.....	512
New York, Cornell Univ., 1894-1902.....	697
Penn. Agr. Col., 1870-1887.....	492
normal schools.....	808
correspondence courses by Penn. State College,	
1892-1900.....	698
exhibit of land-grant colleges at St. Louis exposi-	
tion, 1904.....	704
legislation, Page bill.....	859
Smith-Lever bill.....	861
Michigan act of 1861, authorizing winter lectures.	411
movement for Federal aid, 1903-1914.....	703
rel. to work under Smith-Hughes act.....	878
fairs, early, in United States.....	130
Institute, Bridgeport, Conn., effort to establish.....	183
Aurora, N. Y.....	184
South Carolina, proposal to establish, in 1829.....	182
Museum, periodical of Columbian Agricultural Society, D. C.,.....	128, 149
periodicals, American.....	149
publications in Europe, early.....	26
Reader, Daniel Adams.....	155
School, Derby, Conn.....	161, 176
Storrs, Conn.....	776
Maryland, proposed in resolution of legislature, 1830.....	253
Minnesota, Univ. of.....	780
Wheatland, N. Y.....	184
Kingston, R. I.....	779
John de la Howe's, S. C.....	86
school, in Mich. Constitution of 1850.....	236
schools, (See also Agricultural Education)	
schools and academies, 1820-1860.....	173
classes and numbers, 1915.....	841
county.....	822
early, in Europe.....	15
France.....	16, 17
Hungary.....	15
Prussia.....	15
Europe, rept. of Edward Hitchcock.....	281
Livingston bill for Fed. aid to.....	856
National, resolution of Morrill for.....	319
private secondary, 1900-1915.....	837
State.....	809

	Page
Agricultural societies, early, in America.....	73
Europe.....	28
growth of, 1820-1860.....	134
in Connecticut.....	110
District of Columbia.....	126
Maine.....	88
Massachusetts.....	97, 145
New Hampshire.....	112, 142
New York.....	90, 138
Ohio.....	143
Pennsylvania.....	73
South Carolina.....	84
Virginia.....	118
Society, Hallowell, Maine.....	88
Berkshire, Mass.....	106
New York State.....	141
South Carolina.....	84
Pendleton, S. C.....	87
United States.....	308, 309, 310, 312, 313, 356
Agricultural Society of the United States.....	135, 306
Survey in Massachusetts.....	145
New York.....	188
textbooks.....	155
work of the Patent Office.....	306
Agriculture in some of its relations with chemistry, F. H. Storer.....	399
U. S., general conditions 1873-1887.....	390
status after Revolution.....	3
science of, definition.....	612
State departments of, relations with agricultural colleges.....	716
Agronomie, Chimie Agricole et Physiologie, Boussingault.....	19
Agronomy, development of courses, 1900-1914.....	626
report on secondary course, by A. A. A. C. E. S.....	794
Agrrotechny, development of courses, 1900-1914.....	639
Alabama Agricultural and Mechanical College, agr. expts., 1875-1877.....	469
ext. work, 1872-1887.....	470
(Polytechnic Institute), history, 1872-1887..	465
presidency of William Leroy Broun, 1882-1902..	468
L. T. Tichenor, 1872-1882..	466, 468
agricultural experiment station.....	470
agriculture in normal school.....	806
College (East).....	465, 468
education in Constitution of 1819.....	60
Polytechnic Institute, (See Ala. Agr. and Mech. Col.).....	
Tuskegee Institute, elementary agricultural education.....	917
industrial education.....	843
University of, act creating.....	61
early public support.....	61
Albany (N. Y.) Institute, rel. to Soc. for Prom. of Useful Arts.....	96
Lycaem of Natural History, union with Soc. for the Prom. of Useful Arts.....	96

	Page
Albemarle Agricultural Society (Va.), early days.....	122
effort to endow professorship of agricul- ture in Univ. of Va.....	232
proceedings in American Farmer.....	150
rel. of Thomas Jefferson to.....	120
County Academy, name changed to Central College.....	54
rel. of Thomas Jefferson to.....	53
Alcorn Agricultural and Mechanical College (Miss.), rel. to Fed. land grant, 1878	471
Aldrich, C. R., rel. to agricultural school at Univ. of Minn.....	783
Alfort, veterinary school at.....	16
Alfred University (N. Y.), agricultural school.....	816
Allen, Ira, rel. to Univ. of Vermont.....	40
L. F., rel. to Wash. convention, 1872.....	537
Lou C., rel. to home economics at Ill. Industrial Univ.....	678
William H., president of Penn. Agr. Col., 1864-1867.....	484
Alvord, H. E., rel. to A. A. A. C. E. S.....	568
Washington convention, 1882.....	558
1885.....	564
Mass. Agr. Col.....	440
student at Norwich Univ. (Vt.).....	296
American Agriculturist (N. Y.).....	151
Association for Advancement of Agricultural Teaching.....	803
report on ele- mentary agr. educ., 1923.....	919
Labor Legislation, rel. to Nat. Soc. for the Prom. of industrial education.....	849
Farmer (Md.).....	149
Federation of Labor.....	390
rel. to industrial education.....	843, 851
Page bill.....	861
Gardener, John Gardiner and Daniel Hepburn.....	153
Institute of Instruction.....	163
New York City, petition for agricultural college.....	216
promotion of Federal aid to agriculture...	307
Lyceum Association.....	162
Philosophical Society.....	73, 74
Silk Grower (N. J.).....	152
Society for Promoting Useful Knowledge.....	74
textbook of practical and scientific agriculture, Charles Fox.....	157
Veterinary College (N. Y.), 1875.....	664
Western University, (afterwards Ohio Univ.).....	63
Amherst College (Mass.), agricultural education.....	193
Anderson, John A., rel. to Kans. State Agr. Col.....	427, 428
Leroy, rel. to Calif. Polytechnic School.....	809
Andrew, John A., favored union of agricultural college with Harvard University.	289
Animal chemistry, Liebig.....	19
husbandry, development of courses, 1900-1914.....	637
Annals of Agriculture, Young.....	27
Arator, John Taylor.....	118, 153
Arkansas, agricultural schools.....	819
Armsby, H. P., rel. to Univ. of Wisconsin.....	275
Wash. convention, 1885.....	564
Yale Scientific School (Conn.).....	655
Armstrong, John, Treatise on agriculture.....	156
Samuel C., rel. to Hampton Normal & Industrial Institute (Va.).....	708

	Page
Army Plan for disposal of public lands.....	66
Army, W. F. M., rel. to Morrill's first land-grant bill.....	353
Association for Advancement of Agricultural Teaching, committee on relations of Smith-Hughes Act to Smith-Lever Act.....	880
of American Agricultural Colleges and Experiment Stations (Association of Land-Grant Colleges from 1919) change in name and organization, 1919.....	737
committee on college organization and policy, report on secondary education by the colleges, 1911.....	796
committee on entrance requirements.....	577
extension work, repts. 1906-1914.....	699,703
instruction in agriculture, changed to committee on instruction in agr., h. e., and mech. arts.....	740
organization and early work, 1895-1900.....	577,579
report on adapting instruction to ability of students, 1923.....	761
report on agriculture in rural common schools, 1904.....	907
report on classification of agriculture, 1896	580
college course in agriculture, 1897	582
1903	623
home economics courses, 1911.....	684
improvement of college teaching, 1920-1922.....	754,755,757
rel. of agr. colleges to agr. educ. in high schools, 1916.....	797
rural economics and farm mngt., 1911	647
secondary courses in agr., 1902....	692,792
agronomy.....	794
short courses, 1924.....	767
training teachers of agriculture for secondary schools, 1912.....	796
training of vocational teachers, 1919	753
war work of the agricultural colleges, 1919	731
relations of Smith-Hughes Act to Smith-Lever Act.	880
constitution, 1887.....	567
amended, 1889.....	567
declaration favoring Fed. aid for voc. educ. in public high schools, 1911....	796
organization.....	566,580
proposed at Chicago convention, 1871.....	534
rel. of agricultural experiment stations.....	590
to Commission on National Aid to Vocational Education....	363
Adams Act for agricultural experiment stations.....	606,607
graduate school of agriculture.....	610
Morrill bills of 1890.....	571,572
movement for Fed. aid to agr. extension work.....	703,851
work relating to agricultural education, 1890-1900....	572
Atherton, George W., president of Penn. State College, 1882-	439
rel. to Ill. Industrial Univ.....	523
Washington convention, 1883.....	559
1885.....	565
A. A. A. C. E. S.	566,568,570,577

	Page
Atkeson, Thomas C., History of Patrons of Husbandry.....	394
Atwater, W. O., investigations on human nutrition.....	680
relation to Conn. agr. expt. station.....	401
instruction in home economics.....	686
Storrs (Conn.) Agr. Expt. Station.....	778
Washington convention, 1872.....	536, 537
1882.....	558
Yale Scientific School (Conn.).....	655
Avery, John, jr., relation to Mass. Soc. for Prom. Agr.....	97
Babcock, S. M., at Cornell Univ. (N. Y.).....	512
Univ. of Wis.....	275
Bacon, Francis, influence on education.....	9
Bailey, L. H., address on agriculture in secondary schools, 1908.....	801
chairman of Commission on Country Life.....	646
Development of the textbook of agriculture in North America...	155
paper on rural sociology, 1905.....	652
rel. to agr. ext. work in N. Y.....	697
school at Alfred Univ. (N. Y.).....	816
Mich. Agr. Col.....	417, 419
nature study.....	897, 898
work of N. E. A. on agricultural education.....	799, 801
Baker, William M., rel. to Ill. Industrial Univ.....	523
Barlow, Joel, Prospectus of National institution.....	72, 126
Barr, James A., plan for agriculture in high school at Stockton, Calif.....	833
Barry, P., lecturer at Yale Scientific School short course, 1860.....	252
Bartlett, S. M., rel. to Mich. Agr. Col.....	240
Barton, Benjamin, work in botany.....	24
Bartram, John, work in botany.....	24
William, work on birds.....	24
Bath and West of England Society.....	28
Bayliss, Alfred, member of committee on industrial educ. of N. E. A.....	799
Beal, William J., rel. to Mich. Agr. Col.....	414
Soc. for Prom. of Agricultural Science.....	419, 557
student at Manual Labor School in Lenawee Co., Mich.....	172
Beck, Lewis C., professor in Rensselaer Institute.....	189
T. Romeyn, rel. to Geological Survey, Albany Co. (N. Y.).....	140
Beecher, Catherine, rel. to home economics.....	674
Beekman, J. P., article on N. Y. State Agricultural School.....	212
Bell, Andrew, monitorial school system.....	14
Belmont College, formerly Farmers' College in Ohio.....	200
Benton, G. P., rel. to war work of land-grant colleges.....	729
Bentz, L. and Chretien, A. J., Elements of agriculture.....	156
Berkshire (Mass.) Agricultural Society.....	106
Cattle Show, at Pittsfield.....	105
Berry, Josephine L., rel. to Fed. Bd. for Vocational Education.....	871
Bessey, Charles E., rel. to Iowa State Agricultural College.....	460
statement of early methods of teaching at Mich. Agr. Col.	412
Best Mode of making Wine, John Adlum.....	154
Bibb, W. W., message to Alabama Legislature on Education.....	61
Bigler, William, recommendation for agricultural school.....	259
Bingham, K. S., address at opening of Mich. Agr. Col.....	246
recommendation for agricultural school in Mich.....	240

	Page
Binns, John A., treatise on practical farming.....	78, 153
Bishop, E. C., rel. to department of rural and agricultural educ. of N.E.A..	800
Blackmar, F. W., Federal and State aid to higher education.....	65
Blair, Henry W., rel. to movement for Federal aid to common schools.....	556
James, rel. to William and Mary College, Va.....	48
Blake, John L., Lessons in modern farming.....	157
Bliss, Willard F., rel. to Ill. Industrial Univ.....	523, 526, 527
Blount College, Tenn., precursor of Univ. of Tenn.....	65
Bluemont Central College, Kansas, rel. to Kans. State Agr. Col.....	420
Board of Agriculture, Massachusetts State.....	147
voluntary.....	146
National, proposal for, by U. S. Agr. Soc.....	308
in Congress.....	305
New Hampshire State.....	142
New York State.....	137
Ohio State.....	143
Boards of agriculture, early State.....	137
Bonnetheau, Peter, secretary of Agr. Soc. of S. C.....	85
Borden, Arthur C., rel. to nature study.....	895
Bordley, John Beale, Essays and notes on Husbandry and rural affairs.....	153
rel. to Philadelphia Soc. for Prom. Agr.....	75, 78
Boston Cultivator (Mass.).....	151
Boston Farm School (Mass.).....	177, 917
University, rel. to Mass. Agr. Col.....	449
Botanic Garden, at Columbian Institute for Prom. of Arts and Sciences.(D.C.)	129
Farmers' College in Ohio.....	199
Harvard College.....	100
Mich. Agr. Col.....	414
New Haven, Conn.....	111
Bartram's.....	24
Hosack's.....	25, 45
Marshall's.....	25
Botanists in North America, early.....	24
Botany, development of.....	22
courses in, 1900-1914.....	633
Boussingault, work in agricultural chemistry.....	19
Bowdoin College, early public support.....	41, 42
Bowman, rel. to Washington convention, 1872.....	537
Boys' and girls' clubs, early.....	914
in N. Y., nature study.....	897
Brewer, William H., early teaching of agricultural chemistry at Yale College	249
lecturer at Univ. of Minn. on stock breeding, 1881.....	781
Yale Scientific School short course, 1860...	252
notes on introduction of Merino sheep.....	111
principal of Oakwood Agr. Inst. at Lancaster, N. Y.....	185
proposed professor at People's College (N. Y.).....	231
rel. to Washington convention, 1883.....	559
statements regarding intent of land-grant act of 1862...	361, 362
teacher in Seneca Collegiate Inst. (Ovid Acad.) N. Y....	221, 223
Washington College, Pa.....	223
Brewster, H. W., rel. to agricultural school at Univ. of Minn.....	783
Briggs, George N., message to Mass. legislature favoring agricultural educ..	280
Brigham, J. H., rel. to Hatch Expt. Station bill.....	565
Brinckle, W. D., proposition for agricultural school in Pennsylvania.....	259

	Page
British Board of Agriculture.....	30
Brooks, William Penn, rel. to Sapporo College, Japan.....	449
Broun, William Leroy, rel. to Ala. Agr. and Mech. Col.....	468
Brown, Amos, principal of Ovid (N. Y.) Academy.....	221
rel. to Morrill land-grant bill.....	230, 323, 353
People's College (N. Y.).....	223, 230, 497
Brown, Elmer E., address on National aid in agricultural education.....	801
training of teachers of agriculture, 1908.....	800
rel. to Davis bill for Fed. aid to vocational education...	857
Brown University (R. I.), agricultural education in, 1862-1872.....	384
charter.....	44
Browne, D. Jay, article on agricultural school.....	213
Peter, essay on veterinary schools, 1837.....	664
Bryan, James, plea for establishment of veterinary schools, 1854.....	664
Buchanan, James, rel. to bill for school (asylum) for deaf and dumb in Ky..	343, 353
rel. to Morrill's first land-grant bill.....	324, 353
Buck, S. J., The Granger movement.....	395
Budd, J. L., rel. to Iowa State Agr. Col.....	462
Buel, Jesse, articles on agricultural school in N. Y.....	206
founder and editor of Cultivator (N. Y.).....	151, 207
plan for agricultural school (N. Y.).....	204
Buel Institute and Agricultural Society (Ill.), rel. to Turner's plan for industrial university...	298
de Buffon, Georges Louis Leclerc, work in natural history.....	20
Burkett, Elmer J., rel. to bill for Fed. aid to normal schools.....	855
Burnett, E. A., paper on Agricultural education in secondary schools, 1909.	795
Burrill, Thomas J., rel. to Ill. Industrial Univ.....	523, 527, 530
Burrowes, Thomas H., president of Penn. Agr. Col., 1868-1871.....	484, 492
Burwell, Judge, a founder of Oakwood Agricultural Institute (at Lancaster, N. Y.).	185
Butterfield, Ira H., rel. to movement for Mich. agr. col.....	237
K. L., address on training of teachers of agriculture, 1908...	801
outline of short course in agr. econ., 1903.....	645
papers on rural sociology, 1903-1904.....	650
president of Mich. Agr. Col.....	237
rel. to agricultural instruction of soldiers in France.	733
committee on ext. work of A. A. A. C. E. S.....	699
war work of land-grant colleges.....	729
Bussey Institution, (Mass.), 1870-1887).....	192, 399
Byington, L. G., rel. to Morrill's first land-grant bill.....	353
Byington, A. H., Turner's plan for industrial universities.....	313
Cabell, Joseph C., rel. to Central College, Va.....	54
Univ. of Va.....	52, 55
Calder, James, president Penn. Agr. Col., 1871-1880.....	486
Caldwell, George C., rel. to Cornell Univ. (N. Y.).....	503, 506, 656
Washington convention, 1882.....	558
Calhoun, John C., member of Pendleton Farmers' Society.....	87
president of Columbian Inst. for Prom. of Arts and Sci...	129
California Agricultural Experiment Station, beginnings.....	400
Farmer.....	151
plan for agriculture in high school at Stockton,	833
Polytechnic School.....	809
School of the Youths' Directory of San Francisco, at Rutherford, elementary education.....	917

California, University of, agricultural school at Davis.....	810
Ezra S. Carr, first professor of chemistry as applied to agriculture.....	192
Pbell, J. L., Manual of practical and scientific agriculture.....	157
penter, C. C., bill for agr. expt. stations.....	560, 561
r, Ezra S., lectures on agricultural chemistry at Univ. of Wis.....	274
professor of chemistry as applied to agriculture.....	191
Peter.....	53
riel, Mrs. Mary, statement regarding Morrill's relation to Turner's plan for Fed. land grant to industrial universities.....	315
Lyman, rel. to high school at Elyria, O., teaching agriculture.....	831
rigan, W. T., member of committee on industrial education of N.E.A.....	799
ris, Lewis H., rel. to Fed. Bd. for Vocational Educ.....	871
y, Freeman G., in charge of farm dept., Farmers' College in Ohio.....	196
president of Farmers' College in Ohio.....	194
relation to Morrill's first land-grant bill.....	353
Turner's plan for Fed. land grant to industrial universities.....	314
W. M., rel. to Maryland Agricultural College.....	254
William, founder of professorship of practical agriculture at Farmers' College in Ohio.....	196
esby, Mark, work in natural history.....	24
holepistemiad or University of Michigan, act creating.....	233
tle Show, Berkshire, at Pittsfield, Mass.....	105
tle shows, Elkanah Watson, founder.....	103
le, agricultural school.....	54
tral College, Va., formerly Albemarle Academy.....	54
Jefferson's report on progress.....	54
united to Univ. of Virginia.....	55
dbourne, Paul A., president of University of Wisconsin.....	275
rel. to Mass. Agr. Col.....	436, 451
Washington convention, 1883.....	560
mberlain, William I., president of Iowa State Agr. Col. 1886-1890.....	464
mbers, W. H., professor of agriculture at Ala. Agr. and Mech. Col., 1878-1881....	467
rleston, S. C., College of, early public support.....	57
Chaumont, James LeRay, vice president of N. Y. State Bd. of Agr.....	140
utaqua courses.....	696
ever, Samuel, president of N. Y. State Agr. Col.....	223
rel. to N. Y. State Agr. Col.....	222
mistry, development of.....	17
in its application to agriculture and physiology, Liebig.....	19
cinnatus, journal published at Farmers' Col. in Ohio.....	199
rk, William S., experiments at Mass. Agr. Col.....	451
founder of Sapporo College, Japan.....	449
rel. to Mass. Agr. Col.....	436, 440, 450
Washington convention, 1872.....	535
teacher of chemistry applied to agriculture at Amherst College.....	193
xton, P. P., rel. to Commission on National Aid to Vocational Education...	864
Fed. Bd. for Vocational Education.....	871
y, Alexander, rel. to bill for Fed. aid to agricultural schools.....	856

	Page
Clayton, John, work in botany.....	24
Clinton, DeWitt, rel. to N. Y. State Bd. of Agriculture.....	108, 137
Soc. for the Prom. of Useful Arts (N. Y.).....	137
George, member of Philadelphia Society for Promoting Agriculture...	77
Clute, Oscar, rel. to Mich. Agr. Col.....	405
Clymer, George, rel. to Philadelphia Soc. for Prom. Agr.....	75, 78
Cocke, John H., rel. to Albemarle Agr. Soc. (Va.).....	122
Central College, Va.....	54
effort of Albemarle Society to endow professorship of agriculture in Univ. of Va....	232
University of Virginia.....	55
Cokesbury College (Md.), agricultural work at	170
Colden, Cadwallader, work in botany.....	24
Collier, Peter, rel. to Yale Scientific School (Conn.).....	655
work in agricultural chemistry.....	657
Colman, Henry, reports on agricultural survey in Mass.....	145
Norman J., rel. to Washington convention, 1885.....	564
Colman's Rural World (Mo.).....	151
College curriculum, broadening of.....	164
in Philadelphia.....	38
Colleges, public support of early American.....	34
Colorado, agricultural school in.....	822
agriculture in normal school.....	806
Columbia College, N. Y., Early public support.....	45
professorship of natural history, chemistry and agriculture.....	92
Columbian Agricultural Society (D. C.).....	127
Institute for the Prom. of Arts and Sciences (D. C.).....	129
Comenius, John Amos, system of education.....	9
Commission on Agricultural Education (N. Y.), report.....	218
Country Life, recommendation regarding college courses in agricultural economics and sociology.....	646
Common schools, Blair's relation to movement for Federal aid to common schools...	556
Morrill's relation to.....	548, 550, 551
movement for Federal aid for.....	538
Comstock, Anna B., Handbook of nature study.....	898
entomologist.....	660
John H., rel. to Cornell Univ. (N. Y.).....	509
entomologist.....	660
Connecticut Agricultural Experiment Station, beginnings.....	400
Agricultural Seminary at Derby.....	176
societies in.....	110
Cream Hill Agricultural School.....	178
early agricultural fairs in.....	130
Hartford County Agricultural Society.....	112
New Haven County Agricultural Society.....	111
School of Horticulture, at Hartford, elementary agricultural education at.....	917
Society for Promoting Agriculture in the State of.....	110
Arts, Manufactures and Agriculture (Reported to Phila. Soc. for Prom. Agr.)..	77
State Agricultural Society.....	112, 135
Storrs Agricultural School.....	776

	Page
Connecticut, Yale Scientific School, agricultural education.....	247,383,384,385
Connell, J. H., rel. to committee on instruction in agriculture, of	
A. A. A. C. E. S.....	580
Cook, Charles, rel. to People's College (N. Y.).....	229,230,231,495
George F., rel. to Wash. convention, 1872.....	535
H., first director of N. J. Agr. Expt. Sta.....	192
professor at Rutgers College, N. J.....	192
rel. to Washington convention, 1882.....	558
1885.....	564,565
Cooper, Thomas, rel. to Univ. of Va.....	53, 54
Corbett, L. C., bulletin on school gardens.....	904
Cornell, Ezra, rel. to act creating Cornell Univ.....	497,498
admission of women to Cornell Univ. (N. Y.).....	504
finances of Cornell Univ. (N. Y.).....	500
N. Y. State Agr. Col. at Ovid.....	495
Soc.....	496
seal of Cornell Univ. (N. Y.).....	499
Washington convention, 1872.....	535
Cornell University, act creating.....	497,498
agricultural education, 1868-1872.....	385
experiments, 1874-1879.....	511
experiment station, 1879-1887.....	511
beginnings.....	401
extension work, 1867-1887.....	512
agriculture in plan for.....	501
college of agriculture.....	506
farmers' institutes, 1886-1887.....	512
history, 1856-1887.....	494
presidency of Charles K. Adams, 1885-1892.....	505,510
Cotterman, H. F., paper on Curriculum of agricultural colleges, 1921.....	745
Council of Nature Study and School Gardening.....	904
Country Gentleman (N. Y.).....	151
Coxe, William, View of the Cultivation of Fruit Trees.....	154
Crary, Isaac Edwin, author of provision for univ. in Mich. Constitution of	
1835....	234
Cravath, I. M., poem at opening exercises of Mich. Agr. Col.....	247
Cream Hill Agricultural School (Conn.).....	178
Crescentius, Peter, book on agriculture.....	26
Christiancy, Isaac P., author of act creating Mich. Agr. Col.....	240
Crocheron, B. H., rel. to high school at Sparks Station, Md., teaching	
agriculture.....	835
Crosby, D. J., favored teaching of agriculture in high schools and special	
schools 1909,(N.E.A.)	802
paper on Cooperation between the U.S.D.A. and State schools	
in promotion of agricultural education, 1908.....	801
paper on Correlation of secondary and short courses with	
four-years course in agricultural colleges 1910.....	795
report on agricultural education at N.E.A., 1908.....	801
nature study and elementary agriculture for schools	
of Calif., 1906.....	911
School Garden movement, 1903.....	899
relation to agricultural schools in Georgia.....	813
School Garden Association of America.....	904
work of O.E.S. on secondary agricultural educ...	790

品

	Page
Way, Melvil, rel. to Lake Placid conferences on home economics.....	681,682
Witt, Simeon, plan for agricultural college in New York.....	201
rel. to N. Y. Soc. for the Prom. of Agr., Arts and Mnfrs....	91
trustee of Rensselaer Institute.....	189
strict of Columbia, agricultural societies.....	126
Columbian Agricultural Society.....	127
Institute for the Prom. of Arts and Sciences.....	129
Commissioners, rel. to Washington's proposal for National university...	71
first agricultural fair in.....	131
Society for Promoting Public Economy.....	126
dd, G. H., rel. to Boston Veterinary Institute.....	664
dge, Harvey, recommendation to Congress for Fed. aid to agr. schools.....	308
Henry, proposal for Fed. land grant for academy in Wisconsin.....	271
lliver, rel. to bill for Fed. aid to agricultural extension work.....	857
vocational education in secondary schools....	851,857
mbasle, agricultural school.....	17
nnelly, S. B., rel. to Nat. Soc. for the Prom. of Industrial Education....	847
ugherty, L. S., Agriculture through the laboratory and school garden.....	805
uglas, Stephen A., rel. to second Morrill land-grant bill.....	356
Turner's plan for industrial universities.....	314
wning, Andrew J., Fruit and fruit trees in America.....	154
Theory and practice of landscape gardening and cottage residences.....	154
ublin Society for Improving Husbandry.....	30
ldley, Thomas H., statement regarding agr. expt. stas. at Washington convention, 1883....	560
hamel, Henri L., work in plant physiology.....	23
ummer Academy, Newbury, Mass.....	181
atchess Agricultural Institute (N. Y.).....	184
right, Timothy, president of New Haven (Conn.) County Agricultural Society. rel. to teaching of natural sciences at Yale College.....	111 166,247
University of Virginia.....	54
teacher in academy at Greenfield, Conn.....	161
urle, James T., rel. to Maryland Agricultural College.....	256
st Tennessee College, beneficiary of early National land grant.....	65
ton, Amos, geological and agricultural surveys.....	188
professor in Rensselaer Institute.....	189
teacher of natural sciences and their practical applications...	137
Daniel C., lecturer at Yale Scientific School (Conn.) short course, 1860..	252
onomic conditions in the United States, 1873-1887.....	388
onomie Rurale, Boussingault.....	19
len Hill Farm Institute (Penn.).....	183
ucation, agricultural, Davis bill for Fed. aid in secondary schools.....	849,856
plan of Philadelphia Society for Prom. Agriculture.....	78
as function of church.....	7
State.....	7
beginning of Federal aid.....	66
by the Jesuits.....	8

education, crisis in higher, 1917.....	721
development in Europe.....	6
encouraged in Ordinance of 1787.....	67
general progress in United States, 1870-1890.....	397
in American colonies and early States, governmental relations.....	31
industrial, bulletin on legislation in United States, rel. to.....	849
Davis bill for Fed. aid in secondary schools.....	849, 856
Massachusetts act of 1906.....	846
movement for, in United States.....	843
National Society for the Promotion of, history.....	847
rel. of Mass. State Board of Education to.....	846
Massachusetts Commission on Industrial and Tech. Educ., rept. 1906..	844
methods of State aid.....	65
progress in the United States, 1820-1860.....	158
use of public lands for, Army plan.....	66, 67
Financiers' plan.....	67
vocational, bills for Fed. aid to, prior to 1914.....	855
Commission on National aid for.....	854, 862
definitions of terms relating to.....	850
Dolliver bill for Fed. aid to, in secondary schools.....	851, 857
Federal Board for.....	868, 871
in agriculture, rel. to extension work under Smith-Lever Act..	878
Page bill for Federal aid to, in secondary schools.....	859
Smith-Hughes Act, history.....	842, 867
teacher training under Smith-Hughes Act.....	883
ective system in Brown University.....	167
Harvard College, rel. of George Ticknor to.....	165
ements of agriculture, L. Bentz and A. J. Chretien.....	156
George E. Waring.....	157
scientific agriculture, John P. Norton.....	157, 251
and practical agriculture, Alonzo Gray.....	156
liott, Jared, Essays upon field husbandry.....	153
liott, Edward C., bulletin on Legislation in U. S. rel. to Industrial Educ...	849
lsworth, Henry L., agricultural work in Patent Office.....	306
letter on seed distribution to Elkanah Watson.....	109
rel. to Agr. Soc. of the United States.....	135, 306
secretary Hartford County (Conn.) Agricultural Society....	112
y, Jonathan, teacher of agriculture at literary institution at Chittenango, N.Y...	182
mons, Ebenezer, chief of agricultural section of N. Y. State Geological Survey	191
yclopedia, articles on agriculture.....	26
tomology, development of courses, 1900-1914.....	659
first insectary at Cornell University, 1888.....	663
ssay on calcareous manures, Edmund Ruffin.....	154
ssays on field husbandry, Jared Eliot.....	153
ssays and Notes on Husbandry and rural affairs, John Beale Bordley.....	153

	Page
Irchild, G. T., paper on evolution of agricultural education.....	584
relations of technical to general courses of study..	574
rel. to Kansas State Agricultural College.....	431
Michigan Agricultural College.....	406
Washington convention, 1882.....	558
1885.....	564
James H., lecturer at Ohio Agricultural College.....	270
anning, T., principal of Franklin College, (Tenn.).....	183
rm and Trade School at Boston (Mass.).....	176
rmer's Assistant, John Nicholson.....	153
rmers' Cabinet (Penn.).....	151
College in Ohio, agricultural education.....	194
Botanic Garden.....	199
curriculum of farm department.....	197
rmers' Cooperative Demonstration Work.....	700
rmers, first mass movement, in the U. S.....	391
rmers' High School (now Penn. State College).....	259
(Penn.), act creating.....	260, 261
changes of name.....	265
opening.....	262
student labor.....	264
Institutes, agricultural colleges.....	695
Cornell Univ. (N. Y.) 1886-1887.....	512
Illinois Industrial University, 1870-1887.....	531
Iowa State Agricultural College, 1870-1887.....	465
Kansas State Agricultural College, 1868-1887.....	432
Massachusetts, 1878-1887.....	453
Michigan Agricultural College, 1876-1889.....	418
Mississippi Agricultural and Mechanical College, 1880-1887.....	477
Pennsylvania Agricultural College, 1880-1887.....	493
rmers' Institutes, development of. 1870-1900.....	695
early, by land-grant colleges.....	387
Edward Hitchcock.....	148
Leonard E. Lathrop.....	154
Magazine, proposed by Burlington County, (N. J.) Agricultural Society..	78
Register (Va.).....	126, 151
School Book, J. Orvill Taylor.....	155
rrington, A. M., graduate of Cornell University (N. Y.).....	511
atherstonhaugh, George W., rel. to N. Y. State Board of Agriculture.....	140
ederal Board for Vocational Education.....	868, 871
agricultural work.....	874
policies.....	872
llenberg, Philipp Emanuel, rel. to manual labor schools in United States.....	169
schools at Hofwyl.....	14
rnald, Charles H., rel. to Massachusetts Agricultural College.....	441
M. C., rel. to Washington convention, 1882.....	553, 559
1885.....	564
ss, Simeon D., rel. to Commission on National Aid to Vocational Education....	862
ssenden's Practical Farmer and Silk Manual (Mass.).....	152
nanciers' Plan for disposal of public lands.....	67
sh, Frederick P., rel. to National Soc. for the Prom. of Industrial Education	847
Hamilton, message favoring agricultural colleg in N. Y.....	217
sk, L. R., rel. to Michigan Agricultural College.....	655

	Page
ske, Professor, teacher of agriculture at Ypsilanti (Mich.) Normal School...	239
tch, Asa, Jr., lecturer at Yale Scientific School short course, 1860.....	253
New York State entomologist.....	191, 659
tzherbert, Anthony, Book on agriculture.....	26
agg, W. C., rel. to Chicago convention, 1871.....	534
eischman, Charles L., memorial to Congress for agricultural schools.....	306
int, Charles L., lecturer at Yale Scientific School short course, 1860.....	252
president of Massachusetts Agricultural College.....	450
orida, act to establish agricultural education in normal schools, 1851.....	185
lger, Charles J., rel. to act creating Cornell University (N. Y.).....	498
lwell, W. W., rel. to Chicago convention, 1871.....	533, 534
Washington convention, 1872.....	535, 536, 537
1883.....	559
rbes, S. A., work in entomology in Illinois.....	660
restry, development of courses, 1900-1914.....	635
x, Charles, address on agricultural education.....	313
American textbook of practical and scientific agriculture.....	157
lecturer on agriculture at University of Michigan.....	238, 239
ancke, schools at Halle.....	10
anklin, Benjamin, member of Philadelphia Soc. for Prom. Agr.....	77
Promotion of education.....	35
proposals relating to education of youth in Pennsylvania..	36
rel. to Academy at Richmond, Va.....	51
rel. to American Philosophical Society.....	73
studies on domestic heating.....	679
anklin College (Ga.), first college of university.....	59
(La.), early public support.....	62
(Tenn.) agricultural education.....	183
aser, John, rel. to Penn. Agricultural College.....	484
ear, William, rel. to agricultural experiments at Penn. State College, 1885-1887	492
ee Economical Society in Russia.....	28
ench, Henry F., rel. to Massachusetts Agricultural College.....	436
lecturer at Yale Scientific School (Conn.) short course, 1860	252
H. T., rel. to committee on instruction in agr., of the A. A. A. C. E. S.	580
W. H., rel. to American Asso. for the Advancement of Agricultural	
Teaching.....	803
high schools in Michigan teaching agriculture.....	830
uit and fruit trees in America, Andrew Jackson Downing.....	154
le, Elbridge, rel. to Kansas State Agricultural College.....	425, 427
lloway, B. T., bulletin on school gardening.....	904
lpin, C. J., report on Teaching of rural sociology, 1911-1922.....	766
rdeners' Kalendar (S. C.).....	153
rdiner, John, and Daniel Hepburn, American Gardener.....	153
rdiner Lyceum (Maine).....	173
Robert Hallowell, founder of Gardiner Lyceum (Maine).....	173
nesee Conference Seminary at Lima, N. Y., proposal to give instruction in agr.	182
Farmer (N. Y.).....	151
ology, development.....	21
orge, J. Z., rel. to Hatch Experiment Station Act.....	566
orgia, agricultural schools in Congressional districts.....	812
agriculture in normal schools.....	806

	Page
orgia, early schools.....	57, 58
education in Constitutions of 1777 and 1798.....	58
South Central Agricultural Society.....	135
University of, act creating.....	59
early public support.....	59
professorship of agriculture.....	266
urgical Dictionary, Samuel Deane.....	153
man, D. C., rel. to Chicago convention of 1871.....	533
Washington convention, 1872.....	535, 537
anings on Husbandry, James Humphreys.....	153
ver, Townend, entomologist in Patent Office.....	659
U. S. D. A.....	659
professor at Maryland Agricultural College.....	257
lfrey, F. N., rel. to agricultural school at Alfred University (N. Y.).....	816
assmann, Charles A., rel. to Massachusetts Agricultural College.....	440, 452, 656
Expt. Station.....	452
Washington convention, 1885.....	564
ld, T. S., lecturer at Yale Scientific School short course, 1860.....	252
rel. to Connecticut Agr. Expt. Station.....	180
Society.....	180
State Board of Agriculture.....	180
Cream Hill Agricultural School (Conn.).....	179
Storrs Agricultural School.....	180, 777
Washington convention, 1882.....	558
1885.....	564
odell, Henry H., rel. to Massachusetts Agricultural College.....	440, 451
odrich, Reuben, rel. to Michigan Agricultural College.....	247
ld, John Stanton, rel. to Cornell Univ. (N. Y.).....	507
aham, A. B., rel. to boys' clubs in Ohio.....	915
and-Jouan, agricultural school.....	17
ange, history.....	392
rel. to bills for agricultural experiment stations.....	562
Hatch experiment station bill.....	565
Morrill land-grant college bills, 1890.....	572
ay, Alonzo, Elements of scientific and practical agriculture.....	156
Asa, teacher at Harvard College.....	168
athouse, Charles A., rel. to Federal Board for Vocational Education.....	871
seley, Horace, address at People's College (N. Y.).....	231
editorial on plan for mechanical schools.....	225
rel. to act creating Cornell Univ. (N. Y.).....	497
Morrill's land-grant bill.....	323
People's College (N. Y.).....	226, 229
Turner's plan for industrial universities.....	311, 320
een, Samuel B., rel. to Minnesota agricultural school.....	783, 784
eenough, James Carruthers, president of Mass. Agr. Col.....	451
egg, O. C., superintendent of farmers' institutes in Minnesota.....	781
egory, John Milton, president of Illinois Industrial University, 1876-1880.....	520, 523
rel. to Chicago convention, 1871.....	533
Washington convention, 1872.....	535, 536
iggs, C. R., rel. to Illinois Industrial University.....	518
ignon, agricultural school.....	17
indley, Harry S., rel. to Illinois Industrial University.....	529
osh, A. B., a founder of the Grange.....	392
lly, F. A., rel. to Mississippi Agricultural and Mechanical College.....	476, 477

	Page
en, H. A., first professor of entomology in United States.....	660
e, Benjamin, first principal of Gardiner Lyceum (Maine).....	174
l, Carrie A., rel. to Grange.....	392
James, geologist.....	188, 191
rel. to Iowa State College.....	191
Lyman, message to Georgia Legislature on education.....	58
lowell, Benjamin, founder of Hallowell, Maine.....	88
ilton College, New York, early public support.....	46
John, rel. to Chicago convention, 1871.....	533
committee on extention work of A.A.A.C.E.S.....	699
Pennsylvania Agricultural College.....	487
Washington convention, 1872.....	535, 537
pshire, Franklin and Hampden Society (Mass.), proposal for agricultural school...	278
pton Normal and Industrial Institute (Va.), agricultural education.....	708
cock, John, rel. to Massachusetts Society for Promoting Agriculture.....	97
ey, James P., rel. to National Society for the Promotion of Industrial Education....	847
mon, Lawson, a founder of agricultural school at Wheatland, N. Y.....	184
per, D. N., rel. to Minnesota Agricultural School.....	783
Lewis, rel. to University of Mississippi.....	472
ris, Abram W., rel. to Asso. of American Agr. Colleges & Expt. Stas.....	577
Thaddeus William, entomologist.....	659
Zedekiah H., rel. to Morrill.....	317
Trustee of Norwich University (Vt.).....	292
tford County (Conn.) Agricultural Society.....	112
tlieb, Essay on husbandry learning.....	10
vard College, botanic garden.....	100
early public support.....	41, 42
professorship of natural history.....	100
University, condition in 1857.....	381
vey, L. D., member of committee of National Education Association on industrial education, 1903.....	799
rel. to county agricultural schools in Wisconsin.....	822
ch Experiment Station act, 1887.....	565
K. L., rel. to American Asso. for the Advancement of Agricultural Teaching..	803
county agricultural schools at Winneconne, Wis.....	824
William H., rel. to agricultural experiment station bill.....	565
ty, Abbe Rene Just, work in mineralogy.....	21
kins, Layton S., rel. to Federal Board for Vocational Education.....	871, 872, 874, 876
rs, W. M., address on agricultural industries and home economics in public schools, 1908.....	800
member of committee on industrial education of N. E. A.....	799
rel. to Davis bill for vocational education.....	857
rel. to Minnesota agricultural school.....	783, 784
National Society for the Promotion of Industrial Educ...	849
Nelson amendment to Morrill Act of 1890.....	690
Page bill for vocational education.....	860, 861
statement favoring secondary schools at agricultural colleges, 1910....	795
ywood, Harry, rel. to Mt. Hermon School, Mass.....	838
ald, F. E., bulletin on home projects in agriculture.....	877

	Page
cker, founder of Real schools.....	10
minway, H. D., rel. to school of horticulture at Hartford, Conn.....	900
ary, Joseph, of Smithsonian Inst., favors Turner's plan for industrial universities....	313
W. A., professor of botany and agriculture at Univ. of Wisconsin..	275
rel. to Adams Act for agricultural experiment stations.....	607
dairy school at University of Wisconsin.....	573
short course in University of Wisconsin.....	398, 573
pburn, Daniel and John Gardiner, American Gardener.....	153
rrick, Cheesman A., rel. to Federal Board for Vocational Education.....	871
yward, Thomas, first president of Agricultural Society of South Carolina	85
bbard, B. H., paper on Economics in agricultural colleges.....	747, 763
ggins, James, first Maryland State agricultural chemist.....	254
gh Schools in the United States, 1820-1860.....	160
gh schools teaching agriculture with State aid.....	826
ghland Society of Scotland.....	29
lgard, E. W., rel. to Calif. agricultural experiment station.....	400
Chicago convention, 1871.....	533, 534
University of California.....	657
University of Mississippi.....	472, 657
Washington convention, 1872.....	535
report on Chicago meeting in 1871 on agricultural educ...	473
ll, A. Ross, paper on liberal culture in land-grant colleges.....	747
tchcock, Edward, paper on farmers' institutes.....	148
rel. to agricultural education in Massachusetts.....	279
geological survey in New York.....	188
Massachusetts Agricultural College.....	440
State Board of Agriculture.....	147, 148
report on European agricultural schools.....	244, 281
ar, George F., rel. to bills for Federal aid to common schools	538, 549, 556
henheim, agricultural college.....	16
lbrook, Josiah, founder of lyceums.....	161
rel. to Agricultural School at Derby, Conn.....	161, 176
lder, Arthur E., rel. to Federal Board for Vocational Education.....	871
lloway, D. F., rel. to Morrill's land-grant bill.....	353
lmes, A. J., bill for agricultural experiment stations, 1883.....	561, 563
Ezekiel, principal of Gardiner Lyceum (Maine).....	174
rel. to Maine State Agricultural Society.....	175
College of Agriculture and Mech. Arts	175
John Clough, rel. to Michigan Agricultural College.....	237, 239, 240, 244, 245
me Economics Association, American.....	683
report of committee on home econ.	
instruction....	684
syllabus of home economics, 1913....	686
at Illinois Industrial University.....	677
Iowa State Agricultural College.....	463, 464
Kansas Agricultural College.....	677
course advocated at Michigan Agricultural College, 1870...	413
Davis bill for Federal aid to, in secondary schools.....	849, 856
development of courses, 1900-1914.....	672
Dolliver bill for Federal aid to, in secondary schools....	851, 857
extension work in New York, 1902.....	698
graduate school.....	616, 618, 619, 687
in Smith-Hughes Act of 1917.....	869
Lake Placid conferences.....	681
Page bill for Federal aid to, in secondary schools.....	859
research under Purnell Act of 1925.....	767

1200

	Page
kins, Mark, address at People's College (N. Y.).....	231
gricultural Periodicals in the United States.....	152
Register (Mass.).....	152
griculture, development of courses, 1900-1914.....	633
griculturist (N. Y.).....	152
ack, David, work in botany.....	25
ack's Botanic Garden.....	45
ughton, John, letters and periodical on agriculture.....	27
aston, D. F., rel. to Federal Board for Vocational Education.....	871
ey's Magazine of Horticulture.....	152
y Crops Feed, Samuel William Johnson.....	251
Grow, Samuel William Johnson.....	251
ard, Harrison, plan for mechanical schools.....	224
rel. to People's College (N. Y.).....	226
L. O., graduate of Cornell Univ. (N. Y.).....	511
re, F. W., rel. to New York schools teaching agriculture.....	828
la Howe, John, agricultural school founded by.....	86
land, Gardner G., offer of farm for agricultural school.....	184
obard, Bela, rel. to agricultural education in Michigan.....	235
ghes, D. M., rel. to bill for vocational education.....	867
Commission on National Aid to Vocational Education...	862
bert, John W., rel. to Watson's petition for National Board of Agriculture	109
amel, William G., rel. to Federal Board for Vocational Education.....	875
aphreys, David, premium for imported sheep.....	100
president of New Haven (Conn.) County Agricultural Society	111
James, Gleanings on Husbandry.....	153
at, Leigh S. H., president of Iowa State Agricultural College.....	464
Thomas F., rel. to A. A. A. C. E. S.....	577, 580
graduate school of agriculture.....	609, 610
Illinois Industrial University.....	529
Washington (N. Y.), message favoring agricultural and mechanical	
schools....	226
ton, James, work in geology.....	21
Illinois Agricultural College, history, 1861-1878.....	515
(Northern), act incorporating.....	304
agriculture at consolidated school.....	835
College at Jacksonville, agricultural education.....	839
Industrial League, promotion of industrial university.....	303, 310
University, act creating.....	519
agricultural education.....	526
experiments.....	530
extension work.....	531
farmers' institutes.....	531
history.....	512
methods of teaching agriculture, 1868.....	527
rel. of John Milton Gregory.....	520
to Urbana-Champaign Institute.....	517
student labor.....	524
Memorial to Congress for land grant for industrial university.....	310
Northwestern Fruit Growers' Association.....	135
School gardening in Winnebago County.....	902
State Agricultural Society, rel. to agricultural education.....	304
Normal University, act creating.....	305

	Page
Illinois State University, act creating.....	304
history.....	513
Union Agricultural Society, rel. to agricultural education.....	297
University of (see Illinois Industrial Univ.).....	
Indiana, Agricultural and Technical Institute at Winona Lake.....	838
Farmer.....	151
State horticultural society.....	135
Industrial universities, Turner's plan for, Morrill's relation to.....	320
Industrialist, at Kansas State Agricultural College.....	430
Greenhouse, work in plant physiology.....	22
Introduction to the Knowledge and Practice of Gardening, Marshall.....	153
Iowa, agriculture in high school at Coin, without State aid.....	834
State Agricultural College, agricultural experiments.....	464
Iowa State Agricultural College, aims.....	457
farmers' institutes.....	465
history.....	454
methods of teaching, 1870.....	461
presidency of William I. Chamberlain.....	464
Leigh S. H. Hunt.....	464
Seaman A. Knapp.....	463, 464
Adonijah Strong Welch.....	459
rel. to education in home economics.....	676
student labor.....	457
Society, organized in 1853.....	454
Ireland, W. M., a founder of the Grange.....	392
Irvine, General, donation of land to Farmers' High School (Penn.).....	262
Johnson, W. S., rel. to nature study.....	895
Johnson, C. R., Agriculture through the laboratory and school garden.....	805
Jones, Chester D., bulletin on American agricultural colleges.....	723
report on organization of agricultural colleges, 1917....	593
Jefferson College, La., early public support.....	62
Miss., early public support.....	61
Thomas, address on olives.....	86
bills for a system of education.....	49, 54
farmer.....	120
interest in agricultural societies.....	122
letter on agricultural education.....	121
letters on agriculture.....	121
on relation of State to higher education.....	56
plan for agricultural societies in Virginia.....	122
president of American Philosophical Society.....	74
rel. to Academy at Richmond, Va.....	51
agricultural education.....	232
Albemarle County Academy.....	53
Society (Va.).....	120
Central College, Va.....	54
University of Virginia.....	50, 52, 53, 54, 55
student at William and Mary College.....	50
treatise on the plow.....	122
Jones, W. H., professor of agriculture at Alabama Agricultural and Mech. Col.	466
Johnson, E. H., rel. to Yale Scientific School (Conn.).....	655
Johnson, Montgomery, professor of agricultural science at Maryland Agr. Col....	257
Johnson, D. B., rel. to department of rural and agr. education of N.E.A.....	800

	Page
anson, Samuel William, How Crops Grow, and How Crops Feed.....	251
lecturer at Yale Scientific School short course, 1860	252
professor of agricultural chemistry at Yale Scientific School.....	251
rel. to Connecticut Agricultural Experiment Station.	400
development of agricultural chemistry.....	653, 654
Washington convention, 1872.....	535, 537, 538
William, Management of Orchards and Cider.....	154
Nugae Georgicae.....	154
edan, Whitman H., rel. to Pennsylvania State College.....	487, 492
essieu family, work in botany.....	22
lm, Peter, work in botany.....	25
isas, county agricultural schools.....	824
State Agricultural College, agricultiral experiments.....	432
farmers' institutes.....	432
general influence on agricultural educ...	433
history.....	384, 420
home economics.....	676, 677
presidency of John A. Anderson.....	427, 428, 430
Joseph Denison.....	423, 424, 427
George T. Fairchild.....	431, 433
student labor.....	425, 426, 430
izie, Nellie Sawyer, rel. to home economics at Kansas State Agr. Col.....	677
R. C., rel. to Michigan Agricultural College.....	405, 655
R. F., rel. to Mississippi Agr. and Mech. Col.....	476
hew, Mrs. M. M., rel. to National Society for the Prom. of Industrial Educ.	847
lley, Oliver Hudson, founder of Grange.....	391
naston, C. A., rel. to Michigan Agricultural College.....	405
anebec (Maine) Agricultural Society.....	88
nnicott, John A., rel. to Morrill's land-grant bill.....	353
Turner's plan for industrial universities.....	303, 314
ntucky, State Agricultural Society.....	135
Horticultural Society.....	135
rn, O. J., rel. to boys' clubs in Illinois.....	914
school gardening in Illinois.....	902
report on agricultural education at N.E.A., 1908.....	801
zthely, agricultural school.....	15
ehle, David L., rel. to agricultural school at Univ. of Minn.....	782
lpatrick, V. E., rel. to School Garden Association of America.....	904
ndermann, Ferdinand, agricultural school.....	15
ng's College (N. Y.) , agriculture in course of study.....	90
appeal for funds for.....	90
early public support.....	44
rk, John R., rel. to agricultural education in Normal School in Missouri...	805
training of teachers of agriculture.....	801
app, Seaman A., rel. to bills for agricultural experiment stations.....	401, 561, 562
boys' clubs.....	916
farmers' cooperative demonstration work.....	700
Iowa State Agricultural College.....	462, 463, 464
Washington convention, 1883.....	559, 560
1885.....	564, 565
ights of Labor.....	389
elreuter, work in plant physiology.....	22

	Page
or organizations, 1873-1887.....	389
caster, Joseph, monitorial school system.....	14
d-Grant Act, of 1862.....	317
acceptance by the States.....	370
amendment.....	360
Buchanan's veto of first bill.....	353
capital of land-grant fund.....	373
Congressional proceedings relating to first bill.....	328
second bill.....	357
income of land-grant fund.....	373
intent.....	361
Lincoln's relation to.....	326
mechanic arts in.....	366
Morrill's account of Congressional proceedings.....	322, 325
number of acres in grant.....	372, 373
origin.....	319, 320
text of first bill.....	326
use of land scrip by the States.....	371
Colleges, agricultural experiment station movement.....	388
extension movement.....	388
Association of - See A. A. A. C. E. S.....	737
conditions affecting early status.....	373
Congressional investigation of 1874.....	549
contribution to liberal culture, A. Ross Hill.....	747
for negroes.....	709
improvement of teaching in.....	736, 752
Merrill's bills for Federal aid to.....	401, 540, 570
organization and early work.....	383
rel. to broadening higher education.....	722, 735
war work, 1916-1918.....	727
Federal, beneficiaries of	
Alabama, University of.....	61
Louisiana, University of.....	63
Mississippi, University of.....	61
Ohio academy.....	68
Ohio, Miami University.....	64
Ohio University.....	63, 64
Ohio, university in.....	68
Tennessee (East) College.....	65
proposed, for Wisconsin academy.....	271
and Grants, Federal, discussed at Washington convention, 1872.....	536
for education in new States.....	68
proposal of Alden Partridge.....	293
industrial universities, proposals from Illinois.....	304, 310
State, Georgia, to The Orphan House.....	57
University of Georgia.....	59
Massachusetts, to Bowdoin College (now Maine).....	42
Harvard College.....	41
Williams College.....	42
New Hampshire, to Dartmouth College.....	43
New York, to King's College.....	44
Union College.....	46
South Carolina, to College of Charleston.....	57
Virginia, Transylvania University (Kentucky).....	64
William and Mary College.....	48

ne, Charles H., rel. to Federal Board for Vocational Education.....	875,876
pp, John A., rel. to Commission on National Aid to Vocational Education..	862
throp, Frank W., distribution of aid to vocational education in agriculture	877
John H., first chancellor of University of Wisconsin.....	272
principal of Gardiner Lyceum (Maine).....	174
Leonard E., Farmer's Library.....	154
Laval's farm school near Quebec.....	8
voisier, Antoine Laurent, work in chemistry.....	17
w, James, rel. to Cornell University (N. Y.).....	504, 506, 665
Washington convention, 1883.....	559
w, John, rel. to Columbian Inst. for Promotion of Arts and Sciences.....	129
wrence Scientific School at Harvard College.....	166
University (N. Y.), agricultural school.....	815
zenby, William Rane, rel. to Cornell Univ. (N. Y.).....	509
e, Daniel, advocates Federal institution for agricultural education.....	307
founder of agricultural school at Wheatland, N. Y.....	184
itinerant lecturer on agricultural education.....	215
professor of agriculture at University of Georgia.....	267
rel. to agricultural school at Wheatland, N. Y.....	268
State agricultural school (N. Y.).....	215
U. S. Agricultural Society.....	268, 308
Patent Office.....	268
Stephen Dill, rel. to Mississippi Agricultural and Mechanical College.	475, 477
Washington convention, 1883.....	560
1885.....	564
ipsic University, Agricultural College.....	16
ssons in modern farming, John L. Blake.....	157
ver, Asbury F., rel. to bill for Federal aid to agricultural extension work	861
n Liebig, Justin, work in agricultural chemistry.....	19
gon, Thomas W., recommendation for agricultural college in message to	
Maryland legislature.....	255
ncoln, Abraham, rel. to land-grant act of 1862.....	326, 356, 360
Turner.....	297
Benjamin, rel. to Massachusetts Society for Promoting Agriculture.	97
naeus, Carolus, work in botany.....	22
terary institution, Chittenango, N. Y., agricultural education.....	182
vingston, Leonidas, rel. to bill for Federal aid to agricultural schools.	856
Robert R., advice to Madison on Merino sheep.....	124
experimenter in agriculture.....	96
member of Philadelphia Society for Promoting Agr....	77
rel. to N. Y. Soc. for Prom. of Arts and Manufactures	91, 96
cke, John, theory of education	11
ring, George B., rel. to Washington convention, 1872.....	536
1882.....	558
uisiana, agriculture in State-aided high schools.....	827
College of, early public support.....	62
University of, early public support.....	62
well, John, rel. to Massachusetts Society for Promoting Agriculture.....	97
gger, Otto, rel. to agricultural school at University of Minnesota.....	783
ceums in the United States.....	161
on, Mary, rel. to instruction in home economics.....	675
ons, veterinary school.....	16

	Page
Allister, Hugh N., rel. to Pennsylvania Agricultural College.....	261,478
Bryde, J. M., rel. to A. A. A. C. E. S.....	577
Handless, Henry H., rel. to Cornell Univ. (N. Y.).....	508
Dowell, F. M., a founder of the Grange.....	392
Kee, James Y., rel. to Pennsylvania State College.....	487
Laughlin, James C., bill for Federal aid to agricultural extension work.....	703,851
Clure, William, rel. to Pestalozzi.....	12
work in geology.....	21
Elison, James, appeal for professorship of agriculture in Univ. of Virginia..	232
farmer.....	123
president of Albemarle Agricultural Society.....	123
rel. to Central College, Va.....	54
rel. to University of Virginia.....	55
resolution for National university.....	72
Line Agricultural Society.....	90
and Mechanical College, agricultural education.....	384
Line, agriculture in academies and high schools.....	827
Farmer.....	151
Gardiner Lyceum.....	173
Management of Orchards and Cider, William Johnson.....	154
nn, A. R., Aims and organization of curricula of agricultural colleges.....	743
rel. to committee on relations of Smith-Hughes and Smith-Lever work	880
nn, C. R., rel. to war work of land-grant colleges.....	730
Horace, rel. to educational revival.....	163
school libraries.....	158
Manual labor at Mercer Institute (Ga.).....	171
Waterville College (Maine).....	171
Oberlin College (Ohio).....	171
Institute at Whitesboro, N. Y.....	171
School in Lenawee County, Mich.....	172
schools.....	13,14,169
society.....	171
of practical and scientific agriculture, L. J. Campbell.....	157
training schools, 1876-1913.....	775
pes, James J., professor of natural sciences in American Inst., N. Y. City..	216
teacher of agriculture.....	185
rcy, William L. (N. Y.), recommendation for State Board of Agriculture.....	141
rshall, Introduction to the Knowledge and Practice of Gardening.....	153
Florence, rel. to Commission on National Aid to Vocational Education	862
Humphrey, work in botany.....	25
John, rel. to Society of Virginia for Promoting Agriculture.....	118
ry and William College, early public support.....	48
ryland Agricultural College.....	254
act creating.....	255
agricultural education.....	384
early experiments.....	257
purchase of farm.....	256
united to University of Maryland.....	258
School, proposed in legislature, 1830.....	253
agriculture in State-aided high schools.....	828
high school at Calvert.....	832
Sparks.Station.....	835
early agricultural fairs.....	130

	Page
Maryland, early academies and colleges.....	47
State Agricultural chemist, act providing for.....	253
as itinerant lecturer.....	254
Society, plan for National Agricultural Department	312
rel. to Maryland Agricultural College....	254
University of, beginnings.....	47
Wason, Stephen T., (Mich.) rel. to plan for University of Michigan.....	235
Massachusetts, acceptance of Federal land grant of 1862.....	288
act of 1906, providing for industrial education.....	846
agricultural college, act creating.....	288
incorporating.....	436
agricultural education.....	385
experiment station, 1878-1884	452
experiments.....	451
extension work.....	453
duties of professor of agriculture in 1869	446
general influence on agricultural education	
in U. S....	453
history, 1863-1887.....	288, 434
methods of instruction in agriculture, 1873	447
presidency of Paul A. Chadbourne.....	436, 451
Charles L. Flint.....	450
Henry H. Goodell.....	451
James C. Greenough.....	451
Levi Stockbridge.....	450
rel. to Boston University.....	449
Sapporo College, Japan.....	449
State Board of Agriculture.....	439
Commission recommending union	
with Amherst College.....	450
student labor.....	442
convention, 1851, resolutions for State aid to agr.	
educ...	285
Experiment Station.....	452
Institute, act incorporating.....	278
societies.....	97
rel. to agricultural education.....	145
State aid to.....	145
survey.....	145
agriculture in normal school.....	807
State-aided high schools.....	829
Boston Farm School.....	177
Bussey Institution, 1870-1887.....	399
Commission on Agricultural Education.....	280
agricultural school, 1861.....	287
Industrial and Technical Education.....	844
Dummer Academy at Newbury.....	181
education in Constituion of 1780.....	42
farmers' institutes, 1878-1887.....	453
Industrial School at Boston.....	843
Institute of Technology, act incorporating.....	288
given portion of Federal land grant	
fund of 1862....	288

	Page
Massachusetts, Mt. Hermon School, agricultural education.....	838
movement for agricultural college in.....	145
Ploughman.....	151
proposal for agricultural college in 1825.....	275
School of Agriculture, act creating.....	287
Smith's Agricultural School.....	184, 838
Society for Promoting Agriculture.....	97
journal.....	101
plan for professorship of nat. hist. and botanic garden at Harvard College.....	100
State Board of Agriculture.....	147
appeal to legislature to devote Federal land-grant fund to agr. educ.	288
agricultural extension work 1863-1887	453
rel. to agricultural education...147,286	287
Massachusetts State Agr. Col.	439
voluntary.....	146
prom. of agricultural educ.	285
Education, rel. to industrial education.....	846
Horticultural Society.....	135
Teachers' Seminary at Andover, agricultural education.....	183
Trade School, at Lowell.....	843
Matthews, James, professor of pomology, Iowa State Agricultural College.....	460
Maynard, Samuel T., rel. to Massachusetts Agricultural College.....	440
Mechanics Mutual Protection, Harrison Howard's account.....	224
Mills, Josiah, first president of University of Georgia.....	59
Methods of teaching agriculture, at Ill. Industrial University, 1868.....	527
Miner Institute (Ga.), manual labor.....	171
Merrill, Arthur W., rel. to agricultural school at Lyndonville, Vt.....	840
F. A., Job lesson units for truck and fruit crops.....	877
Miami University, Ohio, beneficiary of early land grant.....	64
Michaux, Andre, work in botany.....	25
Michigan Agricultural College.....	403
act creating	240
giving authority to grant degrees.....	247
hold winter course of lectures, 1861.....	411
agricultural experiments.....	417
admission of women.....	413
aims, 1863-1882.....	406
course in agriculture, 1865.....	408
course of study, 1863.....	407
exercises at opening.....	246
farmers' institutes.....	418
first buildings.....	245
general influence on agr. educ. in U.S.....	419
methods of teaching, 1863-1869.....	412
program of studies, 1871.....	414
student labor.....	409
agriculture in high schools.....	830
county agricultural schools.....	824
legislature, resolution for Federal land grant for agricultural schools, 1850.....	236

Michigan, provision for State university in Constitution of 1835.....	234
1850.....	236
State Agricultural Society.....	135
action for separate agricultural college	240
appeal to legislature for agr. col., 1852	236
purchase of farm for Michigan Agr. Co...	245
rel. to agricultural education.....	235
resolution favoring agr. school at	
Univ. of Mich.....	239
Board of Agriculture, act giving control of Mich. Agr. Col...	247
Normal School at Ypsilanti, rel. to agricultural education...	237, 239
University of, act creating.....	235
agricultural education.....	237
memorial to legislature for agricultural branch.....	236
original laws relating to.....	233
plea for agricultural education, 1855.....	243
les, Manly, rel. to Chicago convention of 1871.....	533
Illinois Industrial University.....	527
Massachusetts Agricultural College.....	441
Michigan Agricultural College.....	405, 408
lledge, John, gift of farm to University of Georgia.....	59
ller, Fred E., rel. to Kansas State Agricultural College.....	425, 427
H. L., address at opening of Michigan Agricultural College.....	246
Mary Rogers, rel. to nature study.....	898
llington, J. N., rel. to University of Mississippi.....	472
lton, tractate of education.....	10
neralogy, development.....	21
nnnesota, agricultural school at Crookston.....	811
Morris.....	812
agriculture in high schools.....	827
County agricultural schools.....	824
University of, Agricultural School.....	574, 780
Dairy School.....	784
lnor, Peter, rel. to Albemarle Agricultural Society (Va.).....	122
lssissippi Agricultural and Mechanical College, agricultural experiments...	477
extension work	477
farmers' institutes.....	477
general influence on agr.	
educ. in U. S.....	478
history.....	475
presidency of S. D. Lee....	475, 477
rel. to Fed. land grant....	471
student labor.....	478
Alcorn Agricultural and Mechanical College, rel. to Federal	
land grant..	471
county agricultural schools.....	825
University of, act creating.....	61
agricultural education, 1871-1880.....	472
early public support.....	61
history.....	471
rel. to Federal land grant.....	471
issouri, agriculture in normal schools.....	805
St. Louis School of Horticulture, school gardening.....	902

	Page
Schill, John, work in botany.....	25
Samuel Latham, as a physician.....	95
letter to Czar of Russia transmitting plow.....	150
professor of natural history, chemistry and agricul- ture in Columbia College.....	46,92
rel. to movement for agricultural education in N. Y.. N. Y. Soc. for Prom. of Agr., Arts and Mnfrs.	95 91
rel. to University of Virginia.....	54
eglin, agricultural school.....	16
editorial school system.....	14,15
rooe, James, rel. to Central College, Va.....	54
University of Virginia.....	54
ody, D. L., rel. to Mt. Hermon School, Mass.....	838
ore, Humphrey, rel. to New Hampshire State Board of Agriculture.....	142
Thomas, agricultural books.....	78
Veranus A., graduate of Cornell Univ. (N. Y.).....	511
gan, O. S., rel. to agricultural school at Alfred Univ. (N. Y.).....	817
Grill Act of 1890, Nelson amendment.....	690
Justin S., address at Massachusetts Agricultural College, 1871.....	449
bills for Federal aid to land-grant colleges.....	401,540
biography.....	317
rel. to bills for Federal aid to common schools.....	548,550,551
Partridge and Norwich University.....	292
Turner's plan for industrial universities.....	315,320
Washington convention, 1872.....	536,537
1882.....	559
1883.....	559
rejoinder to Buchanan's veto to first land-grant bill.....	354
resolution for National agricultural schools.....	315,319
statement regarding Congressional proceedings on land-grant bills....	322,325 328,357
statements regarding intent of land-grant act of 1862.....	361
statements regarding origin of land-grant act of 1862.....	320
Land Grant Act of 1862.....	317
origin.....	319,320
bill, rel. of Amos Brown.....	230
text of first.....	326
rris, John L., rel. to Cornell University (N. Y.).....	504
Robert, rel. to Philadelphia Society for Promoting Agriculture.....	75
rrisville (N. Y.) Agricultural School.....	817
row, G. E., rel. to association of Teachers of Agriculture.....	557
Illinois Industrial University.....	528,530
Iowa State Agricultural College.....	462
Washington convention, 1882.....	558
rton, J. Sterling, rel. to Wash. convention, 1872.....	536
unt Airy Agricultural Institute (Penn.).....	185
dge, Benjamin F., rel. to Kansas State Agricultural College.....	424,427,428
nroe, James P., rel. to Federal Board for Vocational Education.....	855,871
National Society for the Prom. of Industrial Educ...	847
Page bill for Federal aid to vocational educ. in secondary schools..	853 853
rkland, Charles S., rel. to A. A. A. C. E. S.....	577
rray, Bronson, rel. to movement for industrial universities.....	303,314
rtfeldt, C. W., rel. to Chicago convention, 1871.....	533
ers, Charles E., Effectiveness of Vocational Education in Agriculture.....	876

	Page
h, J. A., teacher of agriculture at Amherst College (Mass.).....	193
The Progressive Farmer.....	148,157
ional agricultural schools, resolution of 1856, by J. S. Morrill.....	315
Association of Manufacturers, rel. to Industrial education.....	843
Board of Agriculture, proposal for, in Congress.....	305
Watson's petition.....	109
committee on agricultural education, rel. to dept. of rural educ., N.E.A.	802
industrial education, report on agr. educ, 1908.....	801
Education Association, committee on relations of Smith-Hughes Act to	
Smith-Lever Act.....	880
department of rural and agricultural education,	
organized in 1908.....	800
discussion regarding special agricultural schools,	
1909..	801
rel. to agricultural education in secondary	
schools.	799
report of committee on agriculture in elementary	
schools, 1905.	912
Round table on agricultural education, 1908.....	800
institution, Joel Barlow's prospectus.....	72
Labor Union.....	389
Metal Trades Association, rel. to industrial education.....	843
Society for the Prom. of Industrial Educ., committee on relations of	
Smith-Hughes act to Smith-Lever act.....	880
history.....	847
name changed to Soc. for	
Vocational Education. 1918	855
rel. to Commission on Nat'l	
Aid for Vocat. Educ..	854,862
Deliver bill for	
Fed. aid to Vocat.	
Education.....	858
Page bill for	
Fed. aid to Vocat.	
Education.....	852,861
Scientific Study of Education, yearbook on agr. educ. 1912.	802
University, Pinckney's plan.....	69
Rush's plan.....	69
Washington's proposal.....	69
tural sciences, early teaching in American colleges.....	164
ture study for schools of California, in report of O.E.S., 1906.....	911
in elementary schools.....	895
report of committee on instruction in agr. of A. A. A. C. E. S....	907,909
braska, agricultural school.....	821
agriculture at high school at Fairfield.....	833
edham, Daniel, rel. to Wash. convention, 1872.....	537
ef, Joseph, rel. to object teaching in elementary schools.....	894
school in Indiana.....	13
schools in Pennsylvania.....	12
lson, Knute, rel. to amendment to Morrill Act of 1890.....	690
mours, DuPont, Treatise on education in United States.....	52
stor, Agnes, rel. to Commission on National Aid to Vocational Education.....	862
wberry, John S., lecturer at Ohio Agricultural College.....	270
w England Farmer (Mass.).....	151
Samuel Deane.....	153

	Page
Hampshire, agricultural societies.....	112
rel. to State Board of Agriculture.....	142
Dartmouth College, agricultural education, 1862-1872.....	384
early agricultural fairs.....	130
State Agricultural Society.....	135
Board of Agriculture	142
Haven County (Conn.) Agricultural Society.....	111
Jersey, agricultural education on farm of James J. Mapes.....	185
Agricultural Experiment Station, beginnings.....	401
Baron de Hirsch Agricultural and Industrial School at Woodbine.....	917
College of, charter.....	46
Gazette, agricultural articles.....	149
Rutgers College, agricultural education.....	384
Society for Promoting Agriculture, Commerce and the Arts.....	74
State Horticultural Society.....	135
man, J. S., rel. to Alabama Agricultural and Mechanical College.....	468, 470
Washington convention, 1885.....	565
ton, (N. J.) Farmers' Journal.....	149
York, agricultural education advocated by James Tallmadge.....	205
Agricultural School at Wheatland.....	184
agricultural schools.....	815
societies.....	90
rel. to State Board of Agriculture.....	138
agriculture in high school at Albion.....	834
normal schools.....	808
State-aided schools.....	828
Buel's plan for agricultural school (N. Y.).....	204
Central College, agricultural education.....	184
City, Cooper Union, industrial education.....	843
Mechanics Institute, industrial education.....	843
school gardening in public school system.....	900
College of Veterinary Surgeons, 1864.....	664
Cornell University, agricultural education, 1868-1872.....	385
experiment station, beginnings.....	401
history, 1865-1887.....	494
Cultivator, founded by Jesse Buel.....	207
DeWitt's plan for an agricultural college.....	201
Farmer.....	151
Genesee Wesleyan Seminary, agricultural education.....	839
Literary Institution at Chittenango, agricultural education.....	182
Mechanics Institute at Rochester, industrial education.....	843
movement for agricultural college.....	200
Oakwood Agricultural Institute at Lancaster.....	185
People's College, see under People's College.....	
Society for Promoting Arts.....	74, 90
Promotion of Agriculture, Arts and Manufactures.....	91
State Agricultural College, act incorporating.....	220
favored by Assembly committee on agricul- ture..	218
Ovid, curriculum.....	223
effort to get Federal land grant....	495, 496
purchase of farm.....	222
relation to academy.....	222
Convention, 1836, rel. to movement for State Agr. sch.	208
1837, " " " " " "	208
1838, " " " " " "	212

	Page
New York State Agricultural School, act incorporating.....	208
movement for.....	206
Society, functions as State Board of Agriculture..	141
organization and incorporation.....	97, 141
rel. to farmers' institutes.....	512
movement for agr. educ.....	215, 217, 219
Board of Agriculture.....	137
act establishing.....	139
movement for.....	108
Horticultural Society.....	135
Union Academy at Belleville, agricultural education.....	838
Watson's plan for pattern farm and school.....	203
Women's Institute at Yonkers, school gardening.....	900
Holmes, Hunter, rel. to Washington convention, 1872.....	537
John, Farmer's Assistant.....	153
Wilson C., rel. to University of Virginia.....	54
Lyon, S. F., rel. to agricultural extension work in New York.....	697
Normal schools, agricultural education.....	805, 807
extension work.....	808
Davis bill for Federal aid.....	849, 856
Dolliver bill for Federal aid.....	857
Page bill for Federal aid.....	859
Pollard bill for Federal aid.....	855
rel. to elementary agricultural education.....	907
school gardening.....	902
North Carolina Agricultural Experiment Station, beginnings.....	401
schools.....	825
education in Constitution of 1776.....	56
University of, early public support.....	56
North Dakota, agriculture in high, graded and consolidated schools.....	829
Northern Illinois Agricultural College, act incorporating.....	304
Northwestern Cultivator (Wisconsin).....	151
Fruit Growers' Association (Illinois).....	135
Orton, John Pitkin, Elements of Scientific Agriculture.....	157, 251, 653
professor of agricultural chemistry at Yale College.....	249
student at Yale College.....	248
Pallas Georgicas, William Johnson.....	154
Oakwood Agricultural Institute at Lancaster, N. Y.....	185
Oberlin College (Ohio), manual labor.....	171
Object teaching, in elementary schools.....	894
Office of Experiment Stations, rel. to A. A. A. C. E. S.....	568
Ohio Agricultural and Mechanical College, establishment.....	271
College, plan for.....	269
agricultural societies, rel. to State Board of Agriculture.....	143
agriculture in high school at Elyria.....	831
Home Gardening Association of Cleveland.....	901
Mechanics Institute at Cincinnati.....	843
Pomological Society.....	135
State Board of Agriculture.....	143
University, (formerly Ohio Agricultural and Mechanical College).....	271
act creating.....	63
beneficiary of early Federal land grant.....	63

	Page
Oklahoma, agricultural schools.....	818
agriculture in normal schools.....	807
Orange County (N. Y.) Scientific and Practical Institute.....	184
Quartermaster's Companion (Penn.).....	152
Reans, University of, (La.), act creating.....	62
early public support.....	62
Shan House, Georgia.....	57
Sell, W. B., rel. to boys' clubs in Illinois.....	914
Si (N. Y.) Academy, agricultural education.....	221
effort to connect with New York State Agricultural College	222
Stard, Alpheus Spring, entomologist.....	660
Steele, Carroll S., bill for Federal aid to vocational education in secondary schools	852, 853, 854, 859
rel. to Commission on National Aid to Vocational Education..	862
John.....	51
Stoker, Francis W., rel. to object teaching.....	894
Stones, Mrs. Henry, rel. to school garden work in New York City.....	900
Stridge, Alden, memorial to Congress for use of public lands for education..	293
rel. to agricultural education.....	289, 292
Morrill.....	292
Norwich Academy (now Norwich Univ.) (Vt.).....	289
Student Office, agricultural work.....	306
Sturck, M. R., president of N. Y. State Agricultural College.....	223
Students of Husbandry, see Grange.....	
Sturgeson, James K., rel. to A. A. A. C. E. S.....	568
Sturges, Frank Owen, rel. to nature study.....	896
Sturges, Selim Hobart, rel. to Chicago convention, 1871.....	533
Illinois Industrial University.....	525
Massachusetts Agricultural College.....	440
Washington convention, 1882.....	558
1885.....	565
Sturgeson, R. A., paper regarding mechanic arts in land-grant act of 1862.....	366
rel. to agricultural school at Alfred Univ. (N. Y.).....	816
war work of land-grant colleges.....	729, 730
Sturgeson, W. W., rel. to Minnesota Agricultural School.....	783
Sturgeson Farmers' Society (S. C.).....	87
Pennsylvania Agricultural College, agricultural education, 1862-1872.....	385
experiments.....	479, 491
(State College), history.....	478
name changed to Pennsylvania State Col., 1874	486
presidency of William H. Allen, 1864-1867..	484
George W. Atherton, 1882-	489
Thomas H. Burrowes, 1868-1871	484
James Calder, 1871-1880.....	486
John Fraser, 1867.....	484
Evan Pugh, 1859-1864.....	478
Joseph Shortlidge, 1880.....	487
agriculture in high school at Waterford.....	831
schools.....	830
education in Constitution of 1776.....	40
Farmer, Job Roberts.....	153
Farmers' High School (now Penn. State College).....	259
Franklin Institute at Philadelphia, industrial education.....	843
Girard College, Philadelphia, industrial education.....	843

	Page
Pennsylvania, Mount Airy Agricultural Institute, agricultural education....	185
National Farm School at Doylestown.....	837
State Agricultural Society.....	135,259
rel. to movement for agricultural college.....	259
College,(see also Penn. Agr. Col. and Farmers' High Sch.)	
correspondence courses in agriculture.....	698
rel. of farmers' institutes.....	493
student labor.....	484
Horticultural Society.....	135
University of, charter.....	39
People's College (N. Y.), act incorporating.....	220,227
Association (N. Y.).....	226
at Havana (now Montour Falls).....	229
later uses of buildings.....	232
laying of cornerstone.....	230
objects.....	230
origin.....	224
presidency of Amos Brown.....	230
prospectus.....	226
rel. of Charles Cook.....	229,230,231
Horace Greeley.....	226,229
Harrison Howard.....	226
T. C. Peters.....	226,227
W. H. Seward.....	227
Lucy Stone.....	227
Martin Van Buren.....	227
rel. to Federal land grant.....	494
State act giving Morrill land grant.....	231
Periam, Jonathan, rel. to Illinois Industrial University.....	523,526
Pestalozzi, industrial schools.....	12
Peters, Richard, efforts to secure State agricultural society.....	82
rel. to Philadelphia Society for Promoting Agriculture....	78
second president of Philadelphia Society for Prom. Agr....	76
T. C., rel. to People's College (N. Y.).....	226,227
Philadelphia College, appeal for funds for, in England.....	90
Society for Promoting Agriculture.....	75
committee on prom. of agr. educ.	78
library in 1806-7.....	83
rel. to movement for agr. col.	259
Pickering, Timothy, rel. to Mass. Society for Prom. of Agriculture.....	97
Philadelphia Soc. for Prom. Agr.....	77, 78
Pictet, Professor.....	52
Pierce, John Davis, first State superintendent of public instruction in Mich.	235
rel. to University of Michigan.....	234,235
Pinckney, Charles, plan for National university.....	69
Thomas, first vice president of Agr. Soc. of S. C.....	85
Plant physiology, development.....	22
(The) Plough Boy(N. Y.).....	151
Pollard, Ernest M., rel. to bill for Federal aid to normal schools.....	855
Pöllnitz, Baron, rel. to Washington's proposal for National university.....	71
Pomological Society in Ohio.....	135
Poore, Ben: Perley, Agricultural societies in the District of Columbia.....	126
Population movement after Revolution.....	4
Porter, Edward D., rel. to Minnesota agricultural school.....	781

	Page
Porter, John Addison, plan for short course at Yale Scientific School, 1860..	252
professor of agricultural chemistry at Yale Sci. Sch..	251
rel. to Washington convention, 1882.....	558
Powel, Samuel, first president of Philadelphia Soc. for Prom. Agr.....	76
rel. to nature study.....	896
Practical Farmer, John Spurries.....	153
Practical Farming, John A. Binns.....	153
Prairie Farmer (Illinois).....	151
Prentice, F. W., rel. to Illinois Industrial University.....	527, 665
Prentiss, A. N., rel. to Chicago convention, 1871.....	533
Cornell University (N. Y.).....	504, 507
Michigan Agricultural College.....	405
Washington convention, 1872.....	535
Price, H. C., professor of rural economics at Ohio State University.....	644
Priestley, Joseph, work in physics.....	25, 52
Prince, William, Treatise on Horticulture.....	154
Pritchett, Henry S., rel. to National Society for the Prom. of Industrial E Education..	847
Progressive Farmer, J. A. Nash.....	157
Prosser, C. A., bulletin on legislation relating to industrial education... 849, 850	
rel. to Commission on National Aid to Vocational Education.	862
Federal Board for Vocational Education.....	855, 871
Page bill for Federal aid to vocational education..	853
Pugh, Evan, first president of Farmers' High School (Pa.).....	263
inaugural address at Farmers' High School (Pa.).....	265
plan for Farmers' High School (Pa.), 1862.....	266
industrial college in Pennsylvania, 1864.....	481
rel. to Pennsylvania Agricultural College.....	478, 479, 481
Purnell Act, Federal aid to agricultural experiment stations. 1925.....	767
Queen's College, N. J., charter (later Rutgers College).....	46
Quincy, Josiah, rel. to Massachusetts Society for Promotion of Agriculture.	97
la Quintini, book on agriculture.....	26
Rabelais, influence on education.....	8
Raisin Valley Seminary (Michigan), manual labor school.....	172
Randall, J. L., rel. to school gardening.....	905
Rathbun, Richard, History of Columbian Inst. for Prom. of Arts and Sciences	129
Reasoner, J. R., statement regarding Morrill's rel. to Turner's plan for industrial universities.....	315
Redfield, W. C., rel. to Federal Board for Vocational Education.....	871
Reinoehl, C. M., survey of State courses for rural elementary schools, 1922	918
Rensselaer Institute (N. Y.), history.....	186
Rhode Island Agricultural School.....	779
Brown University, agricultural education.....	384
Richards, Charles R., rel. to National Society for the Prom. of Industrial Education.	847
Ellen Henrietta, rel. to American Home Economics Association.....	683
home economics.....	680, 681
Riley, C. V., entomologist.....	660
rel. to Kansas State Agr. Col.....	425
Rittenhouse, David, president of American Philosophical Society.....	74

	Page
Berts, I. P., rel. to Chicago convention, 1871.....	533
Cornell University (N. Y.).....	508, 510, 511, 512
Iowa State Agricultural College.....	460, 461, 462
Washington convention, 1882.....	558, 559
1885.....	564
Job, Pennsylvania Farmer.....	153
binson, Solon, address on Federal aid to agriculture.....	307
rel. to Agricultural Society of the United States.....	136, 306
Stillman W., rel. to Illinois Industrial University.....	524
dgers, M. M., Scientific agriculture.....	156
osevelt, Theodore, rel. to National Society for the Prom. of Industrial Education..	848
usseau, Jean Jacques, theory of education.....	12
ville, agricultural school.....	17
ffin, Edmund, essay on agricultural education.....	126
calcareous manures.....	125, 154
publisher of Farmers' Register.....	126
rel. to Virginia State Agricultural Society.....	125
secretary of United Agricultural Societies of Virginia.....	150
ral economics, in agricultural colleges.....	746
research under Purnell Act.....	767
engineering, development of courses.....	641
Magazine, Newark, N. J., agricultural articles.....	149
New Yorker (N. Y.).....	151
sociology, development of courses.....	643, 650, 747, 763
research under Purnell Act.....	767
sh, Benjamin, advocated teaching of veterinary science at Univ. of Pa. 1807	664
lecture on veterinary science, before Philadelphia Soc. for Prom. Agr.....	82
plan for National university.....	69
rel. to Philadelphia Society for Promoting Agriculture.....	75
ssell, Thomas, rel. to Massachusetts Society for Promoting Agriculture...	97
tgers College (N. J.), agricultural education.....	384
formerly Queen's College.....	46
ge, Henry W., rel. to admission of women to Cornell Univ. (N. Y.).....	504
finances of Cornell University (N. Y.).....	500
. John's College, Maryland.....	47
Louis (Mo.) Veterinary College, 1875.....	665
lmon, D. E., chief of Bureau of Animal Industry, U. S. Dept. Agr.....	666
graduate of Cornell University (N. Y.).....	511
mpson, H. O., rel. to high school at Calvert, Md., teaching agriculture..	832
Waterford, Pa., teaching agriculture	831
summer school of agriculture in New Jersey.....	808
nborn, E. B., advocated model farm school in New Hampshire.....	185
ndis, Edward.....	48
pporo College, Japan, rel. to Massachusetts Agricultural College.....	449
unders, William, a founder of the Grange.....	392
Saussure, Nicholas Theodore, work in plant physiology.....	23
ahffer, George C., first professor of agricultural science at Md. Agr. Col.	257
hool Garden Association of America.....	904
garden movement.....	898
gardens, for California.....	911
rel. of United States Bureau of Education.....	905

School libraries.....	158
system, beginnings of American public.....	31
Schopmeyer, C. H., Job analyses of agricultural enterprises for Smith-Hughes schools.....	877
Schwartzkopff, Olaf, rel. to Minnesota Agricultural School.....	783
Sciences related to agriculture, development.....	17
Scientific agriculture, M. M. Rodgers.....	156
Scientists in North America, early.....	24
Scott, John H., professor of chemistry in Farmers' College in Ohio.....	194
Scovell, M. A., relation to Illinois Industrial University.....	529, 530
Searley, H. H., Agricultural features of industrial education at N.E.A., 1908	801
Seneca Collegiate Institute (N. Y.), formerly Ovid (N. Y.) Academy.....	222
de Serres, Olivier, book on agriculture.....	26
Seward, W. H., rel. to People's College (N. Y.).....	227
Shattuck, Samuel W., rel. to Illinois Industrial University.....	523
Shearer, Jonathan, rel. to agricultural education in Michigan.....	235
Shearman, Francis W., rel. to Michigan Agricultural College.....	236
Sheep-shearing festivals, at Arlington (Va.).....	131
Sheffield, Joseph E., benefactor of Yale Scientific School.....	251
Sheldon, E. A., rel. to object teaching.....	894
Shelton, Edward M., relation to Kansas State Agricultural College.....	429
Shepard, Charles Upham, plea for agricultural school in Massachusetts.....	278
Shields, James, rel. to Illinois memorial for industrial universities.....	312
Shinn, E. H., Lessons on Plant and Animal Production for Smith-Hughes schools	877
report on elementary agricultural education.....	919
Shortlidge, Joseph, president of Pennsylvania State College, 1880.....	487
Silliman, Benjamin, professor of chemistry and geology at Yale College.....	168
Jr., lectures on agricultural chemistry.....	249, 250
professor of chemistry and geology at Yale College..	168, 248
Silver, Charles W., rel. to Illinois Industrial University.....	527
Sinclair, John, president British Board of Agriculture.....	30
Sipe, Susan B., School Gardens.....	904
Skinner, John S., editor of American Farmer.....	149
memorial to the U. S. Senate, for Federal aid to educational institutions...	307
Smith Agricultural School (Mass.), agricultural education.....	184
Clinton D., graduate of Cornell University (N. Y.).....	511
Goldwin, rel. to Cornell University (N. Y.).....	503
Hoke, rel. to bill for Federal aid to agricultural extension work.....	861
of National Commission for Vocational Education....	867
Commission on National Aid to Vocational Education.....	862
National Soc. for the Prom. of Industrial Education.....	849
J. A., rel. to University of Virginia.....	54
memorial to Congress for agricultural education.....	306
Oliver, founder of Smith's Agricultural School (Mass.).....	183, 838
William, appeal for funds for Philadelphia College.....	90
principal fo Kent County Academy, Md.....	47
provost of Philadelphia College.....	39
work in geology.....	21
W. G., rel. to agricultural schools in Georgia.....	813

	Page
Stewart, Joseph S., rel. to agricultural schools in Georgia.....	813
Stimson, Rufus W., Professional improvement of teachers of agriculture....	876
Stockbridge, Levi, experiments at Massachusetts Agricultural College.....	451, 452
methods of teaching agriculture.....	447
rel. to Massachusetts Agricultural College.....	440, 450
xxxxx	
Stone, Lucy, rel. to People's College (N. Y.).....	227
W. E., rel. to change of name of A. A. A. C. E. S.....	739
war work of land-grant colleges.....	729
Storer, F. H., Agriculture in some of its relations with chemistry.....	399, 653
rel. to Bussey Institution (Mass.).....	399
Storrs Agricultural School in Connecticut.....	776
agricultural experiment station.....	778
Straight, H. H., rel. to nature study.....	895
Strawn, Phoebe G., rel. to Illinois College at Jacksonville.....	839
Stuart, A. P. S., rel. to Illinois Industrial University.....	523
Stubbs, W. C., rel. to Alabama Agricultural and Mechanical College..	466, 467, 469, 470
Student labor, at agricultural colleges.....	605
Farmers' High School (Pa.).....	264
Illinois Industrial University.....	524
Iowa State Agricultural College.....	457
Kansas State Agricultural College.....	425, 426, 430
Massachusetts Agricultural College.....	442
Mississippi Agricultural and Mechanical College.....	478
Pennsylvania Agricultural College.....	484, 486
at Washington convention, 1885.....	569
Swallow, G. C., rel. to Washington convention, 1872.....	535
Symmes, John Cleve, rel. to land grant for academy in Ohio.....	69
Tallmadge, James, advocated agricultural education.....	205
Tappan, Henry P., approved Federal aid for education.....	314
rel. to agricultural education at University of Michigan.....	237
Taylor, Henry C., Economics in agricultural colleges, 1923.....	747, 764
rel. to earlt work in agricultural economics.....	645
report on teaching rural economics, 1909-1921.....	765
John, Arator.....	118, 153
rel. to Society of Virginia for Promoting Agriculture.....	118
J. Orville, Farmer's School Book.....	155
Teacher training, under the Smith-Hughes Vocational Education Act.....	717
Teachers of Agriculture, meetings 1880-1885.....	557
Teachers' Seminary at Andover, Mass., agricultural education.....	183
Tennessee, agriculture at Farrgut School.....	833
Franklin College, agricultural education.....	183
University of, (formerly East Tennessee University).....	65
Terrell, Joseph M., rel. to agricultural schools in Georgia.....	812
William, endowment of professorship of agriculture at Univ. of Ga.....	266
Texas, agriculture in State-aided high schools.....	826
Textbook on agriculture, N. S. Davis.....	156
Textbooks used in 1875 in Massachusetts.....	443
Thaer, Albrecht, agricultural schools.....	16
Principles of Agriculture.....	154
Tharandt, Academy.....	16
Theory and practice of landscape gardening and cottage residences, Andrew Jackson Downing.....	154

	Page
Thompson, Benjamin (Count Rumford), investigations relating to home econ.....	679
Jonathan J. R., a founder of the Grange.....	392
W. O., rel. to Commission on National Aid to Vocational Education..	863
Page bill for vocational education.....	860
war work of land-grant colleges.....	729
Thorne, C. E., rel. to A. A. A. C. E. S.....	568
Washington convention, 1885.....	564
Thornton, William, rel. to first agricultural fair in District of Columbia...	131
Thoughts on the present collegiate system in the United States, Francis Wayland	166
Tichenor, L. T., rel. to Alabama Agricultural & Mechanical College.....	466
Ticknor, George, rel. to elective system at Harvard College.....	165
Tirnova, agricultural school.....	15
Townshend, Norton S., lecturer at Ohio Agricultural College.....	270
professor of agriculture at Iowa Agricultural College..	271, 460
Ohio Agr. and Mech. Col....	271
rel. to agricultural education in Ohio.....	268
Washington convention, 1885.....	564
Transylvania University, (Ky.), beneficiary of early (Va.) land grant.....	64
Treatise on agriculture, John Armstrong.....	156
horticulture, William Prince.....	154
Trimble, Allen, president of Ohio State Board of Agriculture.....	144
John, a founder of the Grange.....	392
Troost, Gerard, work in geology.....	25
True, A. C., Agricultural education, 1908.....	801
in secondary schools, 1909.....	794
Educational work of U. S. Dept. of Agr., 1908.....	800
rel. to Adams Act for agricultural experiment stations.....	607
Commission on National Aid to Vocational Education.....	863
committee on instruction in agr., of the A.A.A.C.E.S....	580
graduate school of agriculture.....	610
report on nature study and elementary agriculture for schools of California, 1906..	911
Rodney H., Early days of the Albemarle Society.....	122
Trumbull, Lyman, rel. to Turner's plan for industrial universities.....	314
Tucker, Gilbert M., List of Agricultural Periodicals.....	151
Tull, Jethro, Horse-Hoeing Husbandry.....	27
Turner, Jonathan Baldwin, plan for agricultural education, 1848.....	297
industrial university (Illinois).....	297, 310
professor in Illinois College at Jacksonville.....	297
promotion of plan for industrial universities.....	314
proposal for land-grant for industrial universities	302, 303
rel. to Abraham Lincoln.....	297
Illinois Industrial League for promotion of industrial university	303
Illinois Industrial University.....	512, 516, 517, 518
State Agricultural Society.....	304
Teachers' Association.....	304
Morrill land-grant bills.....	322, 356
Tuskegee Normal & Industrial Institute, agricultural education.....	708
Tusser, Thomas, Five Hundreth Poyntes of Good Husbandry.....	26

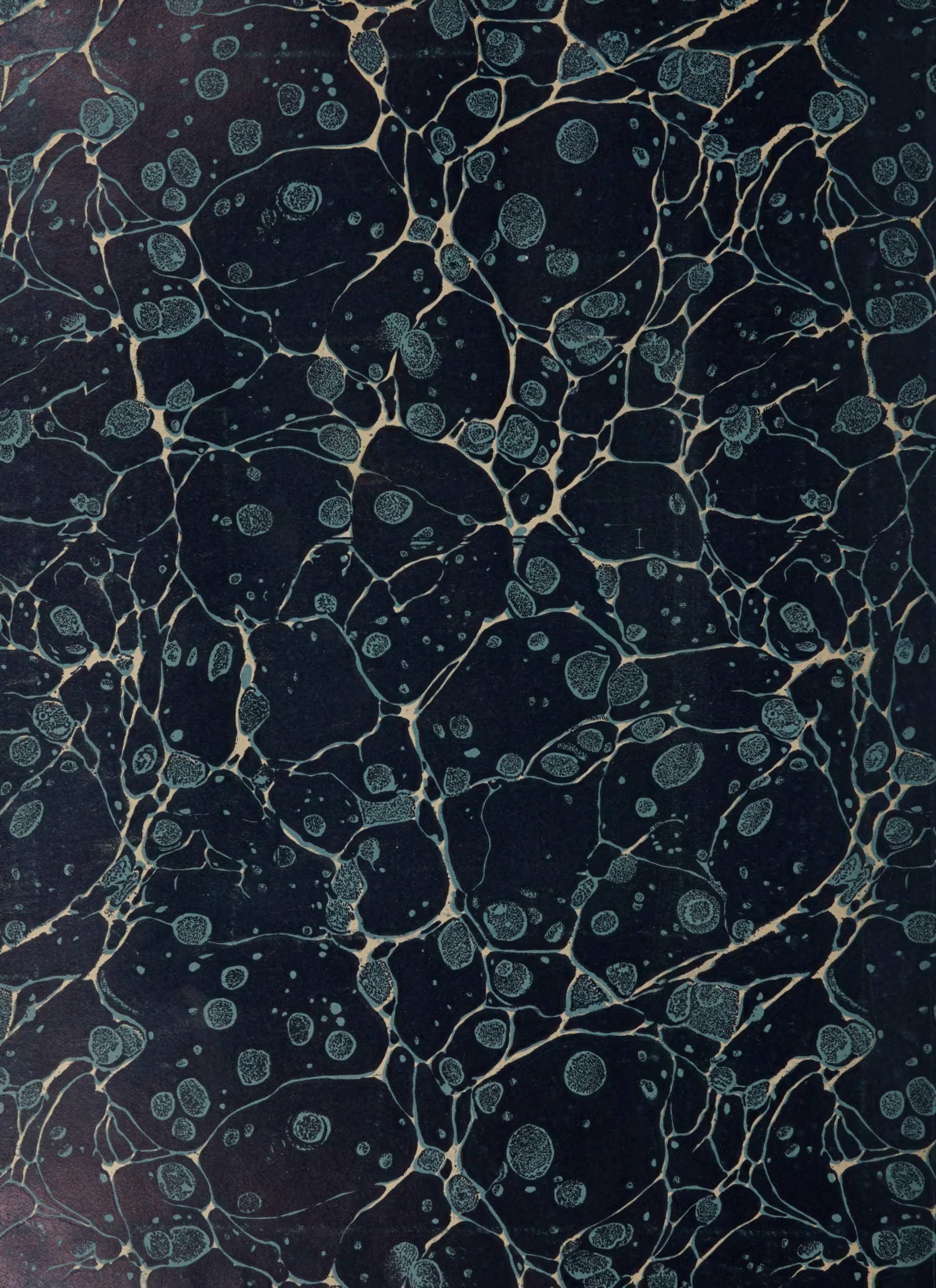
	Page
Union Agricultural Society (Ill.), rel. to agricultural education.....	297
Union College, N. Y., early public support.....	46
United States, Agricultural Society of the.....	135
United States Agricultural Society, journal.....	309
organization and work.....	308
rel. to Morrill land-grant act of 1862	356
movement for U. S. Dept. of Agr.	309, 312
Turner's plan for industrial	
universities.....	310, 312, 313
Bureau of Education, promotion of agr. educ. in secondary	
schools.....	798
Department of Agriculture, 1862-1887.....	400
movement for.....	309
rel. to Washington convention, 1872	535
1882..	558
1883..	559
1885	564
Veterinary Medical Association, rel. to education in vet. med.	667
Universities, rel. to new educational ideas.....	11
University extension work, development in the United States.....	696
of the State of New York, act creating.....	45
Upham, John S., rel. to Kansas State Agricultural College.....	424, 426
Utah, agriculture in high schools.....	830
Vail, Theodore N., rel. to agricultural school at Lyndonville, Vt.....	839
Valley Farmer (Mo.).....	151
Van Buren, Martin, rel. to People's College (N. Y.).....	227
Vanderlip, Frank A., rel. to National Society for the Promotion of Industrial	
Education.....	847
Van Rensselaer, Stephen, founder of Rensselaer Institute.....	186
object in establishing Rensselaer Institute.....	189
president of Albany (N. Y.) Lycaem of Natural	
History	96
N. Y. State Board of Agriculture...	140
rel. to American Lyceum Association.....	164
geological and agricultural survey.....	188
Vaughan, Benjamin, publisher of Rural Socrates.....	89
rel. to Gardiner Lyceum (Maine).....	174
Kennibec (Maine) Agricultural Society.....	88
Massachusetts Society for Promoting Agriculture	89
Charles, rel. to Kennebec (Maine) Agricultural Society.....	88
Massachusetts Society for Promoting Agriculture	97
John, presenation of books to Philadelphia Society for Promoting	
Agriculture.....	78
secretary of American Philosophical Society.....	88
Samuel.....	88
Veterinary institute, at Boston, Massachusetts, 1855.....	664
medicine, accredited veterinary colleges, 1923.....	672
at Cornell University (N. Y.), 1868.....	665
development of courses.....	663
rel. of Bureau of Animal Industry, U.S.D.A., to	
courses in.....	667
standardization of courses.....	667

Veterinary School at Philadelphia, 1853.....	664
schools in France.....	16
science at Illinois Industrial University, 1868.....	665
Vermont, agricultural school at Lyndonville.....	839
Randolph.....	821
education in Constitution of 1777.....	40
Norwich Academy (now Norwich University), rel. of Alden Partridge.	289
University of, agricultural education.....	384
charter.....	40
View of the Cultivation of Fruit Trees, William Coxe.....	154
Virginia, Academy of Arts and Sciences, at Richmond.....	51
Agricultural societies in.....	118
agriculture in high schools.....	826
Albemarle Agricultural Society, early days.....	122
colleges, early public support.....	48
early agricultural fairs.....	130
Hampton Institute, elementary agricultural education.....	917
industrial education.....	843
school gardening.....	901
Literary fund.....	54
Mechanics Institute at Richmond.....	843
Miller School in Albemarle County, industrial education.....	843
Society for Promoting Agriculture.....	118
State Agricultural Society.....	125
University of, act creating.....	55
bills to establish.....	54
Commission on.....	54
early curriculum.....	165
plan for professorship of agriculture.....	232
rel. of Joseph Carrington Cabell to.....	52
Thomas Cooper to.....	53
Thomas Jefferson to.....	50, 53
Vivian, Alfred, Aims of agricultural colleges, 1921.....	744
Curriculum at Ohio College of Agriculture, 1923.....	746
Wade, Benjamin, rel. to land-grant act of 1862.....	325, 352, 357
Wadsworth, James, president of New Haven (Conn.) County Agr. Soc.....	111
Walker, Amasa, rel. to Massachusetts State Board of Agriculture.....	148
C. I., history of Agricultural Society of South Carolina.....	84
Wallace, Henry, rel. to National Society for the Prom. of Industrial Educ..	849
Warder, John A., rel. to Illinois Industrial University.....	527
Warfield, J. D. (Md.), rel. to Washington convention, 1882.....	559
Waring, George E., Elements of agriculture.....	157
William G., superintendent of horticultural department at Farmers' High School (Pa.)	262
Washburne, Elihu B., rel. to Illinois memorial for industrial universities.	312
Washington, Booker T., rel. to Tuskegee Normal and Industrial Inst., Ala...	708
(now Trinity) College, (Conn.), agricultural education in.....	192
College, Md., charter.....	47

	Page
Washington, George, agricultural experiments.....	114
farmer.....	112
letter to Richard Peters on National Board of Agriculture	81
Sinclair on measures for improvement of agr....	116
member of Philadelphia Society for Promoting Agriculture.	77
presentation of Annals of Agriculture to Philadelphia	
Society for Prompting Agr.....	78
proposal for National university.....	69, 70
rel. to William and Mary College.....	50
Waterville College (Maine), manual labor.....	171
Watson, David, rel. to Central College, Va.....	54
Elkanah, founder of cattle shows.....	103
petition for National Board of Agriculture.....	109
plan for pattern farm and school (N. Y.).....	203
rel. to agricultural exhibitions in N. Y.....	107
Berkshire (Mass.) Agricultural Society.....	106
N. Y. State Board of Agriculture.....	108, 137
Watts, Frederick, president of Pennsylvania State Agricultural Society.....	259
rel. to farmers' high school (Pa.).....	260, 261
Pennsylvania Agricultural College.....	478
Washington convention, 1872.....	535, 536
Wayland, Francis, Thoughts on the present collegiate system in the U. S.....	166
Weber, Professor, rel. to Illinois Industrial University, 1880.....	530
Webster, Daniel, delegate to convention for organizing U. S. Agr. Soc.....	308
Noah, The Farmer's Catechism.....	78
member of Philadelphia Society for Promoting Agriculture.....	77
Welch, A. S., rel. to Chicago convention, 1871.....	533
Iowa State Agricultural College.....	459, 460, 463
Washington convention, 1872.....	535
Weld, Mason C., lecturer at Yale Scientific School short course (1860).....	253
Theodore F., field agent of manual labor society.....	171
Werner, Abraham Gottlob, work in geology.....	21
Wesley, Charles, rel. to The Orphan House, Ga.....	57
West Virginia Agricultural and Mechanical College, agricultural education.1867	384
White, Andrew D., address at opening of Cornell University.....	502
rel. to admission of women to Cornell University (N. Y.)...	504
Cornell University (N. Y.).....	497, 498, 499, 501, 503, 504, 505
speech on N. Y. State Agricultural College at Ovid.....	497
People's College (N. Y.).....	495, 497
E. E., address on land-grant colleges.....	559
rel. to Washington convention, 1883.....	560
Whitefield, George, rel. to The Orphan House, Ga.....	57
Whitney, Eli, president of New Haven (Conn.) County Agricultural Society.....	111
Wilder, Burt Green, rel. to Cornell Univ. (N. Y.).....	503
Marshall P., address at Massachusetts Agricultural College.....	449
on agricultural education.....	280
lecturer at Yale Scientific School short course, 1860...	252
member of Massachusetts Commission on Agricultural Educ..	281
president of convention of agr. societies in Mass., 1851.	145
promotion of agricultural education through voluntary	
State board of agriculture.	285
rel. to Massachusetts Institute of Technology.....	288
State Board of Agriculture.....	147, 277

Wilder, Marshall P., rel. to Morrill's first land-grant bill.....	325,353
movement for agricultural college in Mass....	277
proposed Massachusetts Academy of Agriculture	277
Turner's plan for industrial universities....	320
United States Agricultural Society.....	277,308
resolution on agricultural education.....	145
trustee of Massachusetts School of Agriculture.....	287
Wiley, Harvey W., agricultural chemist.....	657
rel. to Washington convention, 1883.....	559,560
Wilkinson, John, principal of Mount Airy (Pa.) Agricultural Institute.....	185
Willard, Emma Hart, rel. to home economics.....	673
Williams, H. G., Work of normal schools in preparing teachers of agriculture	801
Joseph R., address at opening of Michigan Agricultural College..	246
first president of Michigan Agricultural College.....	245
rel. to Morrill's first land-grant bill.....	323,353
Williams College, early public support (Mass.).....	41, 42
Willits, Edwin, rel. to A. A. A. C. E. S.....	568
Michigan Agricultural College.....	416
Washington convention, 1885.....	564
Wilson, James, rel. to Washington convention, 1883.....	559
William B., rel. to Federal Board for Vocational Education.....	871
Page bill for vocational education.....	859
Woodrow, favored Federal aid to industrial and vocational education	867
rel. to Smith-Hughes Act for Vocational Education.....	869,871
Wing, H. H., rel. to committee on instruction in agriculture of A.A.A.C.E.S.	580
Henry Hiram, rel. to Cornell University (N. Y.).....	509
Winslow, Charles H., rel. to Commission on National Aid to Vocational Educ.	862
Federal Board for Vocational Education.....	871
National Society for the Prom. of Indust. Educ.	851
Winthrop, Thomas L., rel. to Massachusetts Society for Promoting Agriculture	97
Winyaw Indigo Society (S. C.).....	84
school founded by.....	84
Wisconsin, agriculture in high schools.....	830
county agricultural schools.....	822
State Agricultural Society.....	135,273
rel. to agr. educ. at Univ. of Wis...	273
Wisconsin University, act creating.....	271,272
Wisconsin, University of, act for reorganization.....	274
agricultural education, 1867.....	384
dairy school, 1886.....	573
early history.....	271
establishment of college of agriculture.....	275
Federal land grant given to.....	274
professorship of agriculture established.....	275
proposals for agricultural education.....	273
provision for, in State constitution of 1848.....	272
short agricultural course, 1886.....	573
Wisconsin, University of the Territory of, act creating.....	271
Withers, W. A., Teaching of chemistry in American agricultural colleges....	658
Wojta, J. F., rel. to agricultural school at Menominee, Mich.....	824
Wood, Nathaniel, member of Massachusetts State Board of Agriculture.....	147
Woodward, A. B., plan for Catholepistemiad or Univ. of Michigania.....	233
Carl R., address on agricultural periodicals.....	149
agricultural college curricula, 1921.....	741
J. S., rel. to farmers' institutes at Cornell Univ. (N. Y.).....	512
Works, George A., Teacher training departments in Smith-Hughes schools.....	876

	Page
Wreidt, Ernest A., rel. to Commission on National Aid to Vocational Educ....	862
Wright, Carroll D., rel. to Massachusetts Commission on Industrial and Technical Educ.....	844
Wynkoop, A. S., article on agricultural education.....	215
Yale College, condition in 1857.....	382
Scientific School (Conn.), agricultural education.....247,383	,384
Yates, John B., founder of literary institution at Chittenango, N. Y.....	182
Richard, rel. to Turner's plan for industrial universities.....310,	312
Youmans, Edward L., handbook of household science.....	679
Young, Arthur, Annals of Agriculture.....	27
Zarvas, agricultural school.....	15
Zoology, development.....	20



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